DUPLICATE ALSO

National Meteorological
Library & Archive
London Road
Bracknell RG12 2SZ

UK METEOROLOGICAL OFFICE
GLOBAL DATA MONITORING REPORT

October 1999

Data Assimilation
Meteorological Office
London Rd
Bracknell
Berkshire
RG12 2SZ

This report has not been published. Permission to quote from it should be obtained from the Head of Data Assimilation

ORGS UKMO U

National Meteorological Library
FitzRoy Road, Exeter, Devon. EX1 3PB

Distribution List

Mr B Sumner	NMC, Victoria, Australia
Dr S. C. Chou	CPTEC/INPE, Brazil
Dr V Wagner	Deutscher Wetterdienst, Hamburg, Germany
Mr M Engels	German Military Geophysical Office, Mont Royal, Germany.
Ms C Nelson	NMC, Washington, USA
Mr H Benichou	SCEM METEO-FRANCE.
Mr E A Meindl	National Data Buoy Centre, Stennis Space Center, USA
Mr G Verner	Canadian Meteorological Centre, Quebec, Canada
Permanent Rep. with WMO	Moscow, Russia
Hydrometcentre of the Russian Federation	Moscow, Russia
Mr Ima'izumi Takao	JMA, Tokyo, Japan
Mr Francois Lalaurette	Head, Meteorological Operations Section, ECMWF, Reading, UK
Dr M J Uddstrom	Met. Service, Wellington, New Zealand
Mr R S Bell	Met. Office, Bracknell, UK
Dr R Bromley	Met. Office, Bracknell, UK
Dr P K James	Met. Office, Bracknell, UK
Mr D A Jenkins	Met. Office, Bracknell, UK
Mr R W Lunnon	Met. Office, Bracknell, UK
Dr B Macpherson	Met. Office, Bracknell, UK
Mr B Oatway	Met. Office, Bracknell, UK
Mr C A Parrett	Met. Office, Bracknell, UK
National Meteorological Library	Met. Office, Bracknell, UK

CONTENTS

1. Introduction

2. Global Data Monitoring Statistics

3. Composite Observing Systems for the North Atlantic (COSNA)

...oooOOOooo...

1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background field). Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

Dr. B. Macpherson
Head of Observation Processing and Monitoring Section
Data Assimilation
Meteorological Office
London Road
Bracknell
Berkshire
United Kingdom
RG12 2SZ

2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1-2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. Only data from the main hours of 00 UTC, 06 UTC, 12UTC and 18 UTC are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At the UK Met. Office, we monitor SYNOP pressure after it has been interpolated to our Global NWP Model's surface height. For most synoptic stations (about 75%), the surface pressure (at the model surface) is calculated from the reported station-level pressure, or, if this is not available, the height of a standard pressure-level (e.g. 850 hPa or 700 hPa). If neither of these are available, or if the reported station-level pressure is deemed unreliable, the reported mean sea-level pressure is used (about 25% of SYNOPs).

Aircraft observations

TABLE 4 contains a list of statistics calculated from data received from all airline carriers.

Figure 3 shows 10 degree lat/long box average numbers of aircraft reports (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) received per day throughout the month at Bracknell and assimilated into model runs in the layer 70-500 hPa. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4-7 show wind statistics for AIREP/ASDAR (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) in the layer 70-500 hPa. Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics (**Geopotential Height and Windspeed at 100 and 500 hPa**) for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.
17. September 1999. Included statistics for high resolution visible winds from Meteosat-5 and Meteosat-7.
18. October 1999. The 3-D VAR assimilation system was upgraded on 19 October, including improvements in the assimilation of ATOVS radiances, use of SSM/I surface wind speed, an improvement in the calculation of surface pressure for SYNOPs, and thinning and revision of observation errors of aircraft data.

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: October 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from UKMO global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 m s^{-1} (vector wind)

SELECTION CRITERIA :NOBS ≥ 20 , and one or more of the following:

1.| bias|	≥ 4 hPa	(pressure),
	≥ 5 m s^{-1}	(wind speed),
	≥ 30 degrees	(direction).
2.SD	≥ 6 hPa	(pressure),
	≥ 80 degrees	(direction).
3.PGE	≥ 25	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	HOUR	ELEM	LEVEL	NOBS.	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
C6YW	ALL	P	SUR	20	0	0	1.7	7.0	7.2
ELUB5	ALL	P	SUR	62	1	2	1.5	6.1	6.3
ELVI2	ALL	P	SUR	64	0	0	1.3	-5.8	6.0
ELWH8	ALL	P	SUR	27	11	41	4.4	0.0	4.4
FNCI	ALL	P	SUR	107	0	0	1.3	-4.1	4.3
LXPB	ALL	P	SUR	21	0	0	1.0	12.0	12.0
OYGA2	ALL	P	SUR	24	0	0	1.8	-4.7	5.0
OZLB	ALL	P	SUR	55	0	0	1.3	-4.4	4.6
PCCQ	ALL	P	SUR	33	0	0	1.0	-6.0	6.1
PGWB	ALL	P	SUR	31	0	0	1.3	-4.5	4.7
P3YS5	ALL	P	SUR	38	0	0	1.6	4.6	4.9
UAIS	ALL	P	SUR	34	1	3	2.3	-8.5	8.8
UAMS	ALL	P	SUR	40	13	32	1.3	0.5	1.4
UDVB	ALL	P	SUR	23	5	22	2.6	-5.6	6.1
UICO	ALL	P	SUR	29	12	41	4.9	-4.4	6.6
VCRQ	ALL	P	SUR	30	30	100			
VRUL7	ALL	P	SUR	27	0	0	1.3	4.4	4.6
VYNG	ALL	P	SUR	29	28	97	0.0	11.9	11.9
V2PB9	ALL	P	SUR	22	0	0	4.1	-8.1	9.1
WDZB	ALL	P	SUR	33	0	0	1.1	-5.5	5.6
ZCAM9	ALL	P	SUR	47	1	2	1.9	10.0	10.2
3FWH4	ALL	P	SUR	23	0	0	0.9	-4.4	4.5
48101	ALL	P	SUR	124	124	100			
48102	ALL	P	SUR	131	85	65	0.8	0.7	1.1
62125	ALL	P	SUR	105	0	0	1.1	5.0	5.1
8PNI	ALL	P	SUR	51	0	0	0.9	-4.3	4.4
WIND SPEED									
C6JE5	ALL	SPEED	SUR	26	0	0	3.6	-6.6	7.5
C6NI3	ALL	SPEED	SUR	26	0	0	5.3	5.4	7.6
ELTZ2	ALL	SPEED	SUR	52	0	0	3.5	5.3	6.4
ELWC6	ALL	SPEED	SUR	50	0	0	7.1	10.6	12.8
FNRS	ALL	SPEED	SUR	22	0	0	6.9	9.4	11.7
UCTP	ALL	SPEED	SUR	54	0	0	4.5	6.7	8.0
ZCBF3	ALL	SPEED	SUR	21	0	0	2.9	5.5	6.2
3FWM4	ALL	SPEED	SUR	67	0	0	3.5	5.6	6.6
8PNK	ALL	SPEED	SUR	35	0	0	3.8	5.3	6.5
9HII6	ALL	SPEED	SUR	33	0	0	6.0	10.8	12.4
9MBQ4	ALL	SPEED	SUR	24	0	0	3.0	5.1	6.0
9MBW	ALL	SPEED	SUR	44	0	0	6.0	5.6	8.2
WIND DIRECTION									
DIDC	ALL	DIRN.	SUR	20	0	0	86.9	30.6	92.1
DJQR	ALL	DIRN.	SUR	35	0	0	94.7	12.8	95.6
FPSS	ALL	DIRN.	SUR	67	0	0	89.8	-14.9	91.0
ZCBH8	ALL	DIRN.	SUR	21	0	0	18.4	32.5	37.4
3FFR6	ALL	DIRN.	SUR	24	0	0	44.4	-52.8	68.9
46012	ALL	DIRN.	SUR	30	0	0	62.1	-37.3	72.5
52315	ALL	DIRN.	SUR	24	0	0	40.8	-79.9	89.7
8PNI	ALL	DIRN.	SUR	31	0	0	31.7	37.0	48.7

AVAILABILITY – SHIP/SYNOP – OCTOBER 1999

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 20906

FIGURE 1

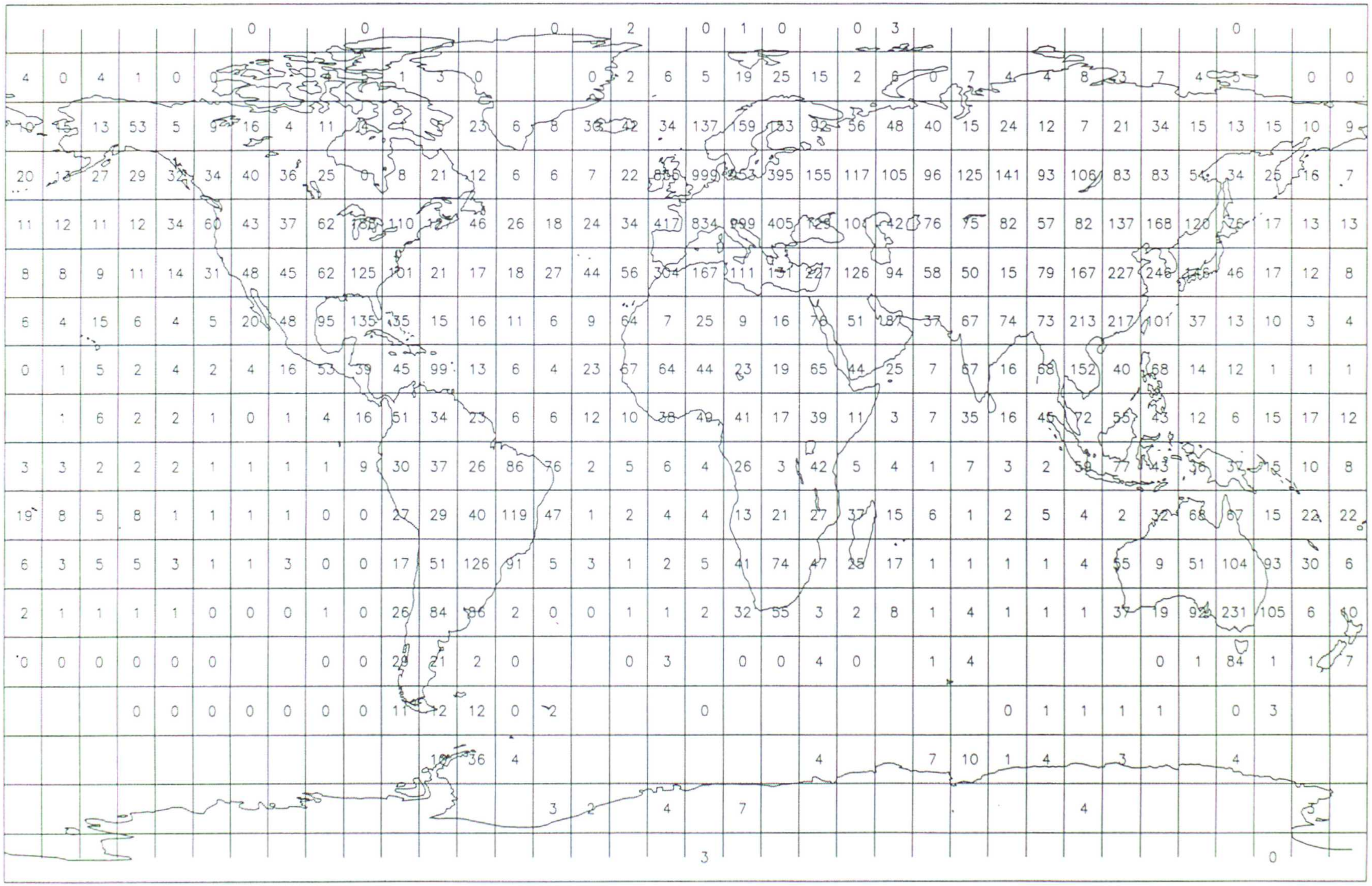

0 0 0 2 0 1 0 0 3 0
4 0 4 1 0 0 1 3 0 0 2 6 5 19 25 15 2 6 0 7 4 4 8 3 7 4 5 0 0
10 15 13 53 5 9 16 4 11 14 8 23 6 8 36 42 34 137 159 133 92 56 48 40 15 24 12 7 21 34 15 13 15 10 9
20 13 27 29 32 34 40 36 25 0 8 21 12 6 6 7 22 856 999 253 395 155 117 105 96 125 141 93 106 83 83 54 34 25 16 7
11 12 11 12 34 60 43 37 62 188 110 12 46 26 18 24 34 417 834 999 405 129 105 42 76 75 82 57 82 137 168 120 76 17 13 13
8 8 9 11 14 31 48 45 62 125 101 21 17 18 27 44 56 304 167 111 131 227 126 94 58 50 15 79 167 227 246 146 46 17 12 8
6 4 15 6 4 5 20 48 95 135 35 15 16 11 6 9 64 7 25 9 16 76 51 187 37 67 74 73 213 217 101 37 13 10 3 4
0 1 5 2 4 2 4 16 53 39 45 99 13 6 4 23 67 64 44 23 19 65 44 25 7 67 16 68 152 40 68 14 12 1 1 1
1 6 2 2 1 0 1 4 16 51 34 23 6 6 12 10 38 49 41 17 39 11 3 7 35 16 45 72 55 43 12 6 15 17 12
3 3 2 2 2 1 1 1 1 9 30 37 26 86 76 2 5 6 4 26 3 42 5 4 1 7 3 2 58 77 43 36 37 15 10 8
19 8 5 8 1 1 1 1 0 0 27 29 40 119 47 1 2 4 4 13 21 27 37 15 6 1 2 5 4 2 32 68 67 15 22 22
6 3 5 5 3 1 1 3 0 0 17 51 126 91 5 3 1 2 5 41 74 47 25 17 1 1 1 1 4 55 9 51 104 93 30 6
2 1 1 1 1 0 0 0 1 0 26 84 86 2 0 0 1 1 2 32 55 3 2 8 1 4 1 1 1 37 19 92 231 105 6 10
0 0 0 0 0 0 0 0 29 21 2 0 0 3 0 0 4 0 1 4 0 1 84 1 1 7
0 0 0 0 0 0 0 11 12 12 0 2 0 0 1 1 1 1 0 3
18 36 4 4 7 10 1 4 3 4
3 2 4 7 4 3
3 0

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: October 1999

Monitoring procedures

Period		:One calendar month.	
Data monitored		:Reports from each unique identifier for drifting buoys.	
Standard of comparison		:Background field from UKMO global model.	
Position		:Average latitude and longitude for period.	
Observation times		:00, 06, 12, 18 UTC	
Elements monitored		:Mean sea level pressure (hPa). :Wind speed (m s^{-1}). :Wind direction (degrees).	
Parameters monitored	:NOBS	:Number of observations received excluding duplicates.	
	:NGE	:Number of observations with gross errors.	
	:PGE	:Percentage of observations with gross errors.	
	:SD	:SD of difference of observations from background values excluding those with gross errors.	
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the observation is veered to the background.**	
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.	
GROSS ERROR LIMIT	:15 hPa	(pressure)	
	:25 m s^{-1}	(vector wind)	
SELECTION CRITERIA :	NOBS	≥ 20 , and one or more of the following:	
	1.| bias|	≥ 4 hPa	(pressure),
		≥ 5 m s^{-1}	(wind speed),
		≥ 30 degrees	(direction).
	2.SD	≥ 6 hPa	(pressure),
		≥ 80 degrees	(direction).
	3.PGE	≥ 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
14917	-25.9	48.6	ALL	P	SUR	237	59	25	6.3	2.4	6.8
31953	-20.8	-40.7	ALL	P	SUR	460	3	1	4.5	5.1	6.8
33946	-48.4	-42.5	ALL	P	SUR	302	113	37	8.2	-5.7	10.0
41852	38.6	-53.8	ALL	P	SUR	279	243	87	5.8	-5.8	8.2
46910	33.6	-168.0	ALL	P	SUR	227	120	53	2.0	-0.7	2.2
54809	2.1	138.0	ALL	P	SUR	52	52	100			
54811	0.7	144.5	ALL	P	SUR	22	22	100			
54923	-24.7	-93.7	ALL	P	SUR	207	0	0	0.9	-5.2	5.3
61553	32.0	-109.8	ALL	P	SUR	28	28	100			
64513	32.8	-113.5	ALL	P	SUR	23	23	100			
73510	-65.2	161.8	ALL	P	SUR	356	195	55	5.4	0.6	5.5
WIND SPEED											
41524	14.8	-65.3	ALL	SPEED	SUR	206	0	0	5.7	13.5	14.6
44722	50.6	-46.8	ALL	SPEED	SUR	29	0	0	0.9	-11.1	11.1
52643	9.6	178.2	ALL	SPEED	SUR	163	0	0	4.0	6.3	7.5
WIND DIRECTION											
55587	-43.6	169.6	ALL	DIRN.	SUR	166	0	0	94.0	57.8	110.4

AVAILABILITY – DRIFTER – OCTOBER 1999

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 6865

FIGURE 2

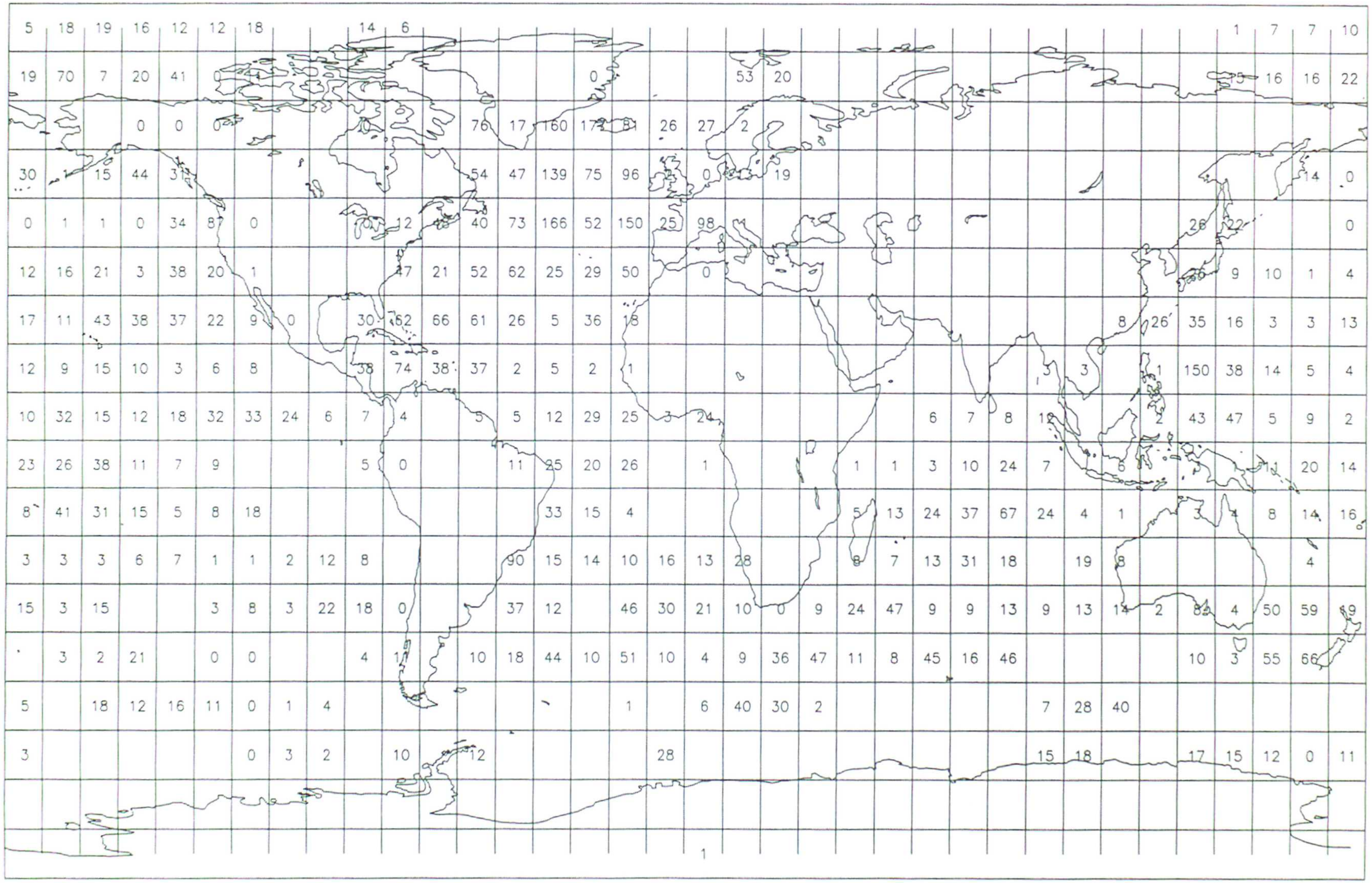

5 18 19 16 12 12 18 14 6 1 7 7 10
19 70 7 20 41 0 0 53 20 15 16 16 22
0 0 0 76 17 160 173 81 26 27 2
30 15 44 31 54 47 139 75 96 0 19 14 0
0 1 1 0 34 87 0 12 40 73 166 52 150 25 98 26 22 0
12 16 21 3 38 20 1 47 21 52 62 25 29 50 0 26 9 10 1 4
17 11 43 38 37 22 9 0 30 162 66 61 26 5 36 18 8 26 35 16 3 3 13
12 9 15 10 3 6 8 38 74 38 37 2 5 2 1 3 3 1 150 38 14 5 4
10 32 15 12 18 32 33 24 6 7 4 5 5 12 29 25 3 24 6 7 8 12 2 43 47 5 9 2
23 26 38 11 7 9 5 0 11 25 20 26 1 1 1 3 10 24 7 6 11 20 14
8 41 31 15 5 8 18 33 15 4 5 13 24 37 67 24 4 1 3 4 8 14 16
3 3 3 6 7 1 1 2 12 8 90 15 14 10 16 13 28 8 7 13 31 18 19 8 4
15 3 15 3 8 3 22 18 0 37 12 46 30 21 10 0 9 24 47 9 9 13 9 13 14 2 83 4 50 59 59
3 2 21 0 0 4 1 10 18 44 10 51 10 4 9 36 47 11 8 45 16 46 10 3 55 66
5 18 12 16 11 0 1 4 1 6 40 30 2 7 28 40
3 0 3 2 10 12 28 15 18 17 15 12 0 11
1

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: October 1999

Monitoring procedures		
Period		:One calendar month.
Data monitored		:Reports from each unique identifier for synops & autosynops.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Surface pressure (hPa).
Parameters monitored	:HT(m)	:Station height (in metres) as given in WMO No. 9 Vol A
	:RP	:Pressure reporting practice M=mean sea level pressure (hPa) reported. S=Station level pressure reported. 8=Geopotential height (m) of 850 hPa surface reported. 7=Geopotential height (m) of 700 hPa surface reported.
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	:Percentage of observations flagged excluding those with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa	(pressure)
SELECTION CRITERIA	:NOBS	≥ 20 ,and one or more of the following:
	1.| bias|	≥ 4 hPa
	2. SD	≥ 6 hPa
	3.PGE	≥ 25.

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60445	36.2N	5.4E	1081	S8	112	0	0	0	0.7	5.1	5.1
60468	35.6N	6.2E	1052	S8	114	113	99	0	0.0	-1.0	1.0
60511	35.3N	1.4E	1127	S8	113	100	88	0	3.9	13.6	14.1
60535	34.7N	3.3E	1144	S8	82	0	0	0	0.7	-5.2	5.2
60670	24.6N	9.5E	1054	S8	99	2	2	1	0.6	9.6	9.6
63330	13.5N	39.5E	2070	MS	51	51	100	0			
63333	11.1N	39.7E	1903	MS	76	0	0	17	1.0	4.8	4.9
63334	10.3N	37.7E	2515	MS	73	0	0	0	1.2	10.5	10.6
63402	7.7N	36.8E	1725	MS	103	0	0	0	0.7	7.4	7.4
63450	9.0N	38.8E	2354	MS	58	0	0	0	0.5	4.3	4.3
63471	9.6N	41.9E	1260	MS	99	0	0	0	0.6	10.2	10.2
63478	5.9N	43.6E	295	MS	59	0	0	0	1.0	6.8	6.9
68396	26.5S	31.3E	641	S8	44	0	0	0	0.9	4.6	4.7

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
30320	56.9N	105.7E	669	S	110	55	50	0	1.4	0.9	1.7
40701	39.3N	44.4E	1470	MS	91	0	0	99	1.4	6.2	6.4
40738	36.8N	54.5E	155	MS	83	31	37	48	4.7	3.2	5.7
40743	36.2N	57.7E	941	MS	109	0	0	0	0.7	-4.8	4.9
40762	35.3N	59.2E	1333	MS	108	4	4	0	1.2	-13.1	13.2
40763	35.2N	58.5E	1060	MS	40	0	0	40	0.5	-4.8	4.8
40783	32.4N	49.7E	1972	MS	79	1	1	81	0.8	-4.2	4.3
40789	33.8N	55.1E	921	MS	78	0	0	100	0.9	7.2	7.3
40836	30.8N	51.7E	1880	MS	54	0	0	93	1.0	6.2	6.3
40859	29.0N	53.7E	1383	MS	76	0	0	97	1.6	7.8	8.0
41254	23.1N	57.7E	1755	S8	64	64	100	0			
41396	16.0N	48.9E	700	MS	39	2	5	0	0.8	6.7	6.7
41466	13.7N	44.1E	1402	8	38	1	3	45	0.9	-5.4	5.5
41535	34.2N	73.3E	1308	8	21	1	5	29	0.7	-5.2	5.2
44477	27.0N	87.4E	1445	S8	44	36	82	0	0.4	2.2	2.2
47022	40.8N	128.2E	1200	S	86	0	0	3	1.5	4.4	4.6
51495	43.5N	91.6E	874	M	114	0	0	0	1.4	8.6	8.7
52955	35.6N	100.8E	3201	S	118	0	0	0	0.6	13.3	13.3
53588	39.0N	113.5E	2898	S	118	118	100	0			
54587	39.1N	123.2E	4	M	97	0	0	1	1.1	-4.1	4.2
56287	30.0N	103.0E	629	M	118	0	0	1	1.0	4.3	4.4
56385	29.5N	103.3E	3049	S	117	0	0	23	1.7	-4.8	5.1
56444	28.5N	98.9E	3488	S	117	3	3	0	0.5	14.1	14.1
56462	29.0N	101.5E	2994	S	117	0	0	0	1.1	9.3	9.4
57006	34.6N	105.8E	1143	M	115	0	0	0	1.6	4.0	4.3

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	128	MS	44	0	0	0	1.1	-5.5	5.6
82326	3.8S	62.1W	48	MS	86	0	0	1	1.3	4.0	4.2
82586	5.2S	39.3W	212	MS	86	1	1	1	1.0	-4.0	4.1
83214	10.3S	54.9W	285	MS	75	0	0	8	3.0	-6.1	6.8
83235	12.4S	46.4W	604	MS	85	0	0	2	1.2	6.8	6.9
83319	14.7S	52.4W	315	MS	85	0	0	1	1.2	-4.4	4.6
83332	14.1S	46.4W	826	MS	84	15	18	0	0.8	13.6	13.6
83361	15.6S	56.1W	151	MS	82	2	2	7	1.8	4.1	4.5
83408	14.3S	43.8W	447	MS	75	3	4	4	1.1	10.2	10.3
83423	16.7S	49.3W	741	MS	84	0	0	0	0.9	-4.7	4.8
83488	17.8S	42.9W	1097	MS	85	85	100	0			
83531	18.6S	46.5W	940	MS	83	0	0	1	1.2	-6.9	7.0
83587	19.9S	43.9W	850	MS	84	0	0	1	1.1	-7.3	7.4
83773	23.1S	48.9W	793	S	34	0	0	0	1.0	-10.3	10.3
83836	25.5S	50.6W	837	MS	87	0	0	0	0.9	-4.7	4.8

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
83953	30.9S	55.5W	231	MS	87	1	1	39	5.5	-4.2	6.9
84377	3.8S	73.3W	125	MS	80	0	0	3	1.1	4.0	4.1
84401	5.2S	80.6W	49	MS	81	0	0	1	1.4	5.2	5.4
84425	5.9S	76.1W	179	MS	36	0	0	0	1.0	4.4	4.5
84455	6.5S	76.4W	281	MS	59	1	2	5	2.6	6.1	6.6
84472	7.1S	78.5W	2620	S	36	2	6	0	0.8	-5.9	6.0
84501	8.1S	79.0W	26	MS	81	0	0	0	0.8	4.1	4.2
84686	13.6S	72.0W	3248	S	84	0	0	0	1.0	-5.1	5.2
84720	14.9S	75.0W	567	MS	54	0	0	0	0.9	4.8	4.9
84782	18.1S	70.3W	468	MS	85	0	0	0	1.5	8.2	8.3
85140	14.3S	67.4W	140	MS	23	1	4	4	1.7	4.3	4.6
85141	14.5S	67.6W	204	MS	22	0	0	0	1.4	4.4	4.6
85210	16.3S	58.4W	124	MS	23	1	4	0	2.1	4.5	5.0
85406	18.3S	70.3W	55	M	116	0	0	0	1.2	5.7	5.8
85432	22.5S	68.9W	2320	S8	81	0	0	0	0.8	5.3	5.4
85836	43.6S	71.8W	277	M	22	0	0	0	1.5	4.1	4.4
88903	54.3S	36.5W	3	M	67	0	0	54	3.1	-8.6	9.1

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
70194	66.6N	145.3W	431	S	28	28	100	7			
72376	36.8N	108.2W	1677	M	112	0	0	7	2.2	6.9	7.2
72475	38.4N	113.0W	1536	M	115	0	0	22	2.2	4.6	5.1
76055	31.0N	114.9W	440	MS	53	16	30	0	1.0	0.1	1.0
76118	30.4N	109.7W	1040	MS	32	0	0	0	0.8	-9.1	9.1
76632	20.1N	98.7W	2417	MS	27	0	0	0	0.7	-5.1	5.1
76658	19.2N	103.7W	494	MS	35	0	0	0	0.7	6.4	6.4
76750	18.5N	88.3W	9	MS	67	0	0	0	0.8	-8.2	8.2
76773	17.8N	97.8W	1680	MS	24	0	0	0	1.0	8.3	8.4
76775	17.1N	96.7W	1550	MS	49	0	0	0	0.7	4.4	4.5
76845	16.7N	92.6W	2276	MS	63	63	100	0			

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
91163	21.9N	159.6W	7	8	348	348	100	0			
92010	6.1S	145.4E	1587	M	34	0	0	59	0.6	9.2	9.2
95611	34.6S	118.5E	107	MS	107	0	0	42	5.3	4.2	6.8
95909	36.5S	148.3E	1957	MS	118	118	100	0			

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
01360	61.9N	7.9E	712	MS	119	0	0	13	2.2	5.6	6.0
10557	50.5N	11.1E	845	S8	355	136	38	7	1.2	-2.8	3.0
11146	47.1N	13.0E	3105	S7	87	0	0	14	1.3	-4.4	4.6
11343	47.1N	13.0E	3105	S7	119	0	0	13	1.3	-4.3	4.5
13593	41.3N	22.4E	1031	8	53	0	0	26	1.2	-5.6	5.7
14528	44.8N	15.9E	246	S	21	0	0	71	2.0	4.6	5.0
14650	43.8N	18.0E	967	S	38	1	3	97	0.7	-5.8	5.8
16227	41.9N	13.6E	655	MS	260	245	94	0	0.2	-14.7	14.7
17042	41.4N	41.4E	33	M	114	0	0	0	1.3	4.3	4.5
17092	39.8N	39.5E	1218	S8	117	0	0	1	1.3	7.6	7.7
17203	38.9N	40.5E	1177	S8	111	0	0	0	0.9	4.8	4.9

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89108	89.0S	1.0W	2755	S	115	0	0	0	1.7	6.1	6.3
89266	72.2S	60.3W	91	S	95	87	92	44	5.0	-1.9	5.3
89272	75.0S	70.8W	1395	S	255	86	34	0	1.2	-13.0	13.1
89327	73.2S	127.1W	30	S	92	72	78	49	1.4	-12.8	12.9
89586	69.1S	87.0E	207	S	88	54	61	0	1.5	0.2	1.5
89612	66.3S	110.8E	390	S	84	84	100	6			
89667	78.0S	166.5E	10	S	142	41	29	20	7.1	-2.6	7.6
89744	74.0S	43.0E	3353	S	257	0	0	0	1.0	8.4	8.5
89774	73.4S	76.8E	2563	S	274	0	0	0	1.1	4.4	4.5
89805	74.1S	109.8E	3096	S	148	54	36	14	4.0	4.4	5.9
89847	67.6S	146.0E	30	S	115	0	0	18	2.5	-6.2	6.7
89872	78.0S	170.8E	45	S	106	0	0	41	1.0	8.2	8.3

TABLE 4

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: October 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:All hours combined.
Level(s) monitored		:All levels
Elements monitored		:TEMP in °C ; WIND in m s^{-1}
Parameters monitored		
	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.
GROSS ERROR LIMITS		:10.0 °C ; 60 m s^{-1} Vector Wind
SELECTION CRITERIA		:N REP $\geq$ 20

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAA	88	1	32	1.5	0.7	85	2	33	0	6.4	0.2
AAH	110	1	16	1.8	0.2	109	0	17	0	9.6	2.5
AAL	6028	1	14	1.5	0.2	5975	0	15	0	9.1	0.9
AAR	1868	1	7	1.7	-0.4	1860	0	9	0	9.1	0.7
ACA	2008	0	2	1.6	-0.1	2012	0	3	0	7.9	0.7
ACI	58	5	53	1.5	-0.2	55	0	51	0	9.0	3.0
ADB	20	5	30	2.4	-1.1	20	0	20	0	12.2	6.3
AEA	446	1	4	2.3	1.1	426	0	7	0	10.6	0.5
AEL	557	18	36	4.2	2.0	559	0	8	0	8.9	0.7
AEY	44	0	7	2.3	0.8	44	0	7	0	8.0	1.2
AFL	480	1	5	2.3	0.9	478	0	3	0	7.2	1.1
AFR	1837	3	10	1.9	0.4	1842	0	9	0	8.7	1.0
AIH	381	1	2	1.6	0.3	378	1	4	0	8.2	1.1
AJM	125	0	7	1.6	0.1	127	0	7	0	7.0	0.7
AMM	99	2	7	2.0	0.9	98	0	5	0	7.4	1.7
AMT	630	4	44	3.3	-0.7	623	0	34	0	7.2	0.4
AMX	267	3	6	2.0	0.4	267	1	6	0	11.1	0.5
ANA	1266	0	6	1.6	0.0	1261	0	7	0	8.4	0.7
ANZ	4073	2	47	1.7	-0.1	3994	0	46	0	7.8	0.8
AOM	809	1	8	1.7	0.8	815	0	7	0	7.2	0.9
ARG	61	0	33	2.0	0.5	61	0	36	0	10.4	4.2
AUA	30	0	0	1.1	0.2	31	0	3	0	9.9	0.5
AVA	616	1	3	1.8	0.6	611	0	4	0	9.2	1.6
AVE	257	2	7	1.8	1.1	254	0	9	0	11.5	2.4
AVN	118	2	35	1.3	0.4	117	2	34	0	6.0	0.2
AXF	67	28	57	1.1	0.1	48	0	40	0	7.5	2.5
AZA	690	13	30	4.0	2.5	700	0	8	0	9.6	1.3
BAF	35	0	3	1.4	-0.9	37	3	11	0	11.4	0.6
BAL	419	0	10	1.4	-0.4	421	0	11	0	7.7	0.6
BAW	1841	0	7	1.8	-0.1	1839	0	8	0	8.0	0.6
BBB	58	0	3	1.7	-0.4	59	0	7	0	11.9	0.6
BLX	42	0	2	1.5	-0.2	40	0	10	0	12.4	1.3
BWA	315	1	5	2.0	1.4	313	0	7	0	10.3	1.2
CAL	509	1	5	1.6	0.3	521	0	6	0	8.6	1.0
CCA	328	2	9	2.6	0.7	358	0	18	0	13.3	0.3
CDN	2460	1	6	1.8	0.1	2438	0	6	0	8.4	0.6
CES	263	0	8	1.8	0.5	275	1	9	0	11.4	0.7
CFG	944	1	4	1.5	-0.7	931	0	5	0	7.9	0.5
CKS	450	2	38	2.1	1.2	443	0	38	0	6.2	0.2
CKT	268	1	4	2.2	1.6	255	0	6	0	9.3	1.3
CLX	434	4	8	1.8	-0.4	434	0	6	0	8.2	0.7
CMI	477	3	6	1.7	0.9	458	0	3	0	9.5	1.7
CMM	790	1	11	1.5	0.2	778	0	11	0	7.1	0.7
COA	1594	0	17	1.5	0.2	1589	0	20	0	11.2	2.2
CPA	97	0	8	1.5	0.3	103	0	8	0	6.8	0.1
CRL	404	1	9	1.8	0.9	399	0	9	0	8.8	1.6
CSN	64	0	8	2.4	0.0	67	3	10	0	11.5	0.4
CTB	163	1	2	1.5	0.0	163	0	3	0	8.1	1.0
CUB	459	0	6	2.8	1.8	464	0	7	0	9.0	0.7
DAL	4432	0	26	1.6	0.2	4453	0	26	0	7.6	0.7
DBY	660	1	4	1.5	-0.2	654	0	6	0	9.0	0.6
DLH	3004	1	5	1.7	-0.1	3007	0	6	0	8.3	0.9
EEZ	78	23	38	4.3	3.5	78	0	14	0	8.4	2.2
EIA	396	3	39	2.3	1.0	392	1	37	0	8.9	1.1
ELY	124	1	3	1.3	0.1	127	1	6	0	9.1	0.1
EVA	2265	1	4	1.6	-0.2	2262	0	5	0	8.5	0.3
EWW	128	0	3	1.8	0.6	129	0	3	0	8.4	1.2
FDX	1834	0	14	1.6	0.6	1823	0	14	0	8.6	0.4
FIN	320	1	4	1.8	0.3	314	1	6	0	10.2	0.7

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
FJI	1305	9	45	1.7	0.7	1191	0	39	0	7.6	0.9
FOM	259	21	56	1.3	0.1	209	0	44	0	8.0	0.7
FWQ	38	0	50	1.2	0.1	38	0	50	0	4.5	0.4
GAF	56	0	9	2.0	-0.5	55	0	11	0	12.0	0.4
GCO	95	2	17	2.2	0.9	96	0	19	0	11.1	2.4
GHA	68	1	6	1.6	-0.1	70	0	6	0	9.6	0.2
GIA	32	0	19	1.1	0.5	31	0	19	0	6.1	1.8
GRL	30	0	0	1.6	-0.2	30	0	0	0	4.6	0.3
GTI	214	2	8	1.7	-0.3	225	0	11	0	10.6	0.7
HAL	3303	0	32	1.4	0.4	3261	0	33	0	8.8	1.4
HLF	92	1	3	1.8	-0.5	95	1	3	0	7.6	0.5
HRH	176	31	77	1.1	-0.1	148	0	68	0	8.9	1.7
IBE	3217	1	13	2.0	0.5	3180	0	13	0	8.8	0.7
ICE	1323	1	4	1.8	0.3	1300	0	4	0	7.4	0.5
IWD	244	0	4	1.4	0.1	247	0	5	0	8.3	1.2
JAL	7102	0	4	1.7	0.4	7030	0	4	0	8.5	0.9
JAZ	310	0	3	1.7	1.2	300	0	4	0	7.7	0.6
JKK	233	0	9	1.6	0.2	211	0	13	0	10.1	0.1
KAL	3774	1	9	1.7	-0.3	3770	0	10	0	9.1	0.7
KIW	70	10	49	2.9	2.3	63	0	41	0	6.6	1.3
KLM	2802	0	12	1.6	0.4	2789	0	13	0	8.1	0.9
LAN	42	7	17	2.5	1.2	42	0	10	0	9.1	1.4
LAP	60	2	27	2.9	1.5	60	0	23	0	10.0	1.5
LDA	132	0	6	1.7	-0.3	128	0	6	0	7.6	0.9
LDI	428	1	46	3.7	1.6	434	0	9	0	9.2	1.0
LGL	32	0	0	1.8	-0.7	32	0	3	0	6.9	-0.6
LIB	307	1	5	1.9	1.3	310	1	7	0	8.9	1.2
LOB	28	86	96	7.9	7.8	31	0	23	0	9.4	2.1
LOT	251	0	3	2.1	-1.1	251	1	7	0	10.7	0.3
LPR	38	3	16	3.0	1.1	37	0	11	0	12.7	2.6
LTU	658	1	6	1.6	0.1	655	0	5	0	7.7	0.9
LXR	50	0	12	2.1	1.6	49	2	16	0	10.2	-0.6
MAS	443	1	9	1.7	0.4	466	0	9	0	9.4	0.9
MON	231	1	2	1.4	0.1	223	0	4	0	9.5	0.9
MPD	369	0	3	1.8	0.5	370	1	4	0	8.0	1.1
MPH	789	0	3	1.7	-0.4	789	0	4	0	8.1	0.6
NCA	644	0	2	1.8	0.2	638	0	4	0	8.7	0.4
NWA	10463	0	8	1.7	0.6	10281	0	8	0	8.5	0.6
OAL	38	0	3	2.1	1.2	40	0	8	0	13.2	-0.8
PAC	289	2	64	2.9	0.8	289	0	29	0	9.7	0.2
PAL	994	0	4	1.6	-0.3	914	0	5	0	9.7	0.9
PAO	384	14	63	1.4	0.3	331	0	57	0	8.1	0.5
QFA	1992	1	53	1.6	0.3	1973	0	52	0	7.7	0.7
RAF	54	0	4	2.4	1.3	51	0	2	0	7.8	1.0
RBA	22	5	9	1.4	0.0	22	0	5	0	5.3	1.3
RCH	451	2	15	2.0	0.6	428	0	19	0	11.0	1.7
RKA	108	0	7	1.5	0.1	107	0	9	0	9.9	1.5
ROY	81	1	4	1.3	-0.3	85	0	2	0	7.4	1.3
RRR	130	2	7	1.5	-0.1	129	0	6	0	7.9	0.3
RYN	468	0	35	1.5	0.9	470	0	35	0	5.8	0.2
RZO	95	0	1	1.9	-0.6	95	0	6	0	12.3	0.8
SAA	245	1	4	1.3	0.0	242	0	5	0	8.3	0.6
SAB	33	0	3	1.9	0.0	36	0	3	0	7.6	2.8
SAS	1695	0	26	1.8	-0.4	1692	0	27	0	8.1	0.4
SIA	705	0	4	1.8	0.0	696	0	5	0	8.6	0.4
SLR	195	1	9	1.6	-0.7	194	0	8	0	7.1	0.8
SOL	56	0	4	1.7	0.6	55	0	2	0	5.5	0.7
SVA	93	0	3	1.7	-0.1	95	0	2	0	8.3	0.5
SWR	70	1	9	1.8	0.5	72	0	7	0	8.9	3.0

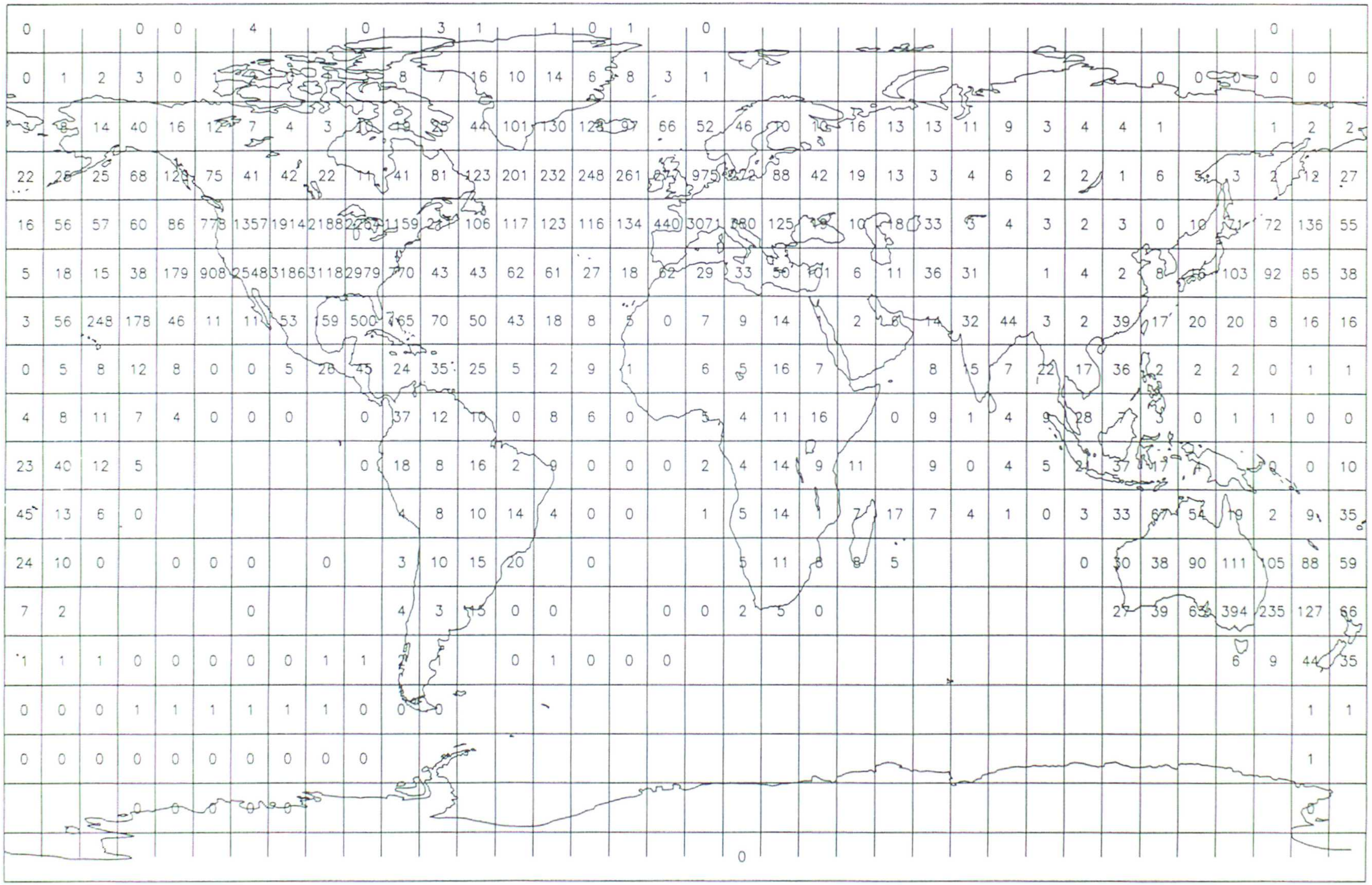
		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
TAP	804	1	6	1.6	0.0	796	0	7	0	9.6	1.3
THA	486	1	6	1.7	-0.3	482	0	7	0	8.4	0.9
THT	110	2	17	2.5	1.2	107	0	17	0	7.0	1.2
TOW	171	0	8	2.2	1.1	170	1	10	0	9.0	1.4
TPA	47	0	4	1.8	0.7	45	0	2	0	5.7	0.2
TSC	148	0	1	1.9	0.6	153	0	3	0	9.2	0.8
TWA	1594	2	11	1.7	0.4	1512	0	10	0	8.8	0.6
UAL	83445	0	83	1.2	-0.2	83372	0	83	0	6.1	0.6
UPS	1428	1	24	1.8	0.4	1435	0	23	0	8.6	0.4
USA	318	0	3	1.9	0.3	244	0	3	0	11.3	1.5
VIR	573	1	4	1.7	-0.2	579	0	5	0	8.8	1.4
VKG	57	0	4	1.7	0.7	59	0	5	0	9.4	1.3
VRG	182	2	26	2.3	1.1	180	0	73	0	10.1	1.2
VSP	47	4	21	1.8	1.6	45	0	18	0	6.4	1.2
VVR	72	8	32	3.0	2.0	73	0	23	0	9.6	0.8
WOA	223	0	12	1.8	0.6	235	0	12	0	7.9	1.2
AN	23847	0	8	1.4	0.2	23847	0	8	0	6.3	0.8
AR	3176	0	100	2.8	2.5	3161	0	3	0	6.8	1.5
BA	10109	0	3	1.5	0.7	10045	0	3	0	6.1	0.9
EU	111913	0	31	1.3	0.1	111906	0	30	0	6.4	0.8
KL	7688	0	8	1.4	0.8	7677	0	8	0	6.2	1.0
LH	2694	0	3	1.7	1.1	2726	0	3	0	6.0	0.8
MK	5563	0	49	1.8	1.5	5545	0	3	0	8.1	1.7
NZ	3158	0	5	1.4	-0.1	3158	0	5	0	6.4	1.2
OZ	53	0	51	1.8	-0.8	53	4	55	0	8.9	1.2
QF	21499	0	6	1.4	0.5	21490	0	6	0	6.0	0.8
SA	3446	0	24	2.2	1.9	3441	0	4	0	6.8	1.0
SV	1182	0	100	2.1	1.9	1161	0	100	0	5.5	1.0
WA	273	5	16	1.7	0.4	269	4	32	0	13.1	-3.9
XX	3264	1	7	1.4	0.2	3746	0	10	0	10.6	1.0
N	743	2	18	2.4	0.6	764	1	18	0	9.7	1.0
US ACARS	542424	0	27	1.2	0.3	542161	0	28	0	6.0	0.8

MEAN DAILY COUNT OF AIRCRAFT 70 - 500 HPA

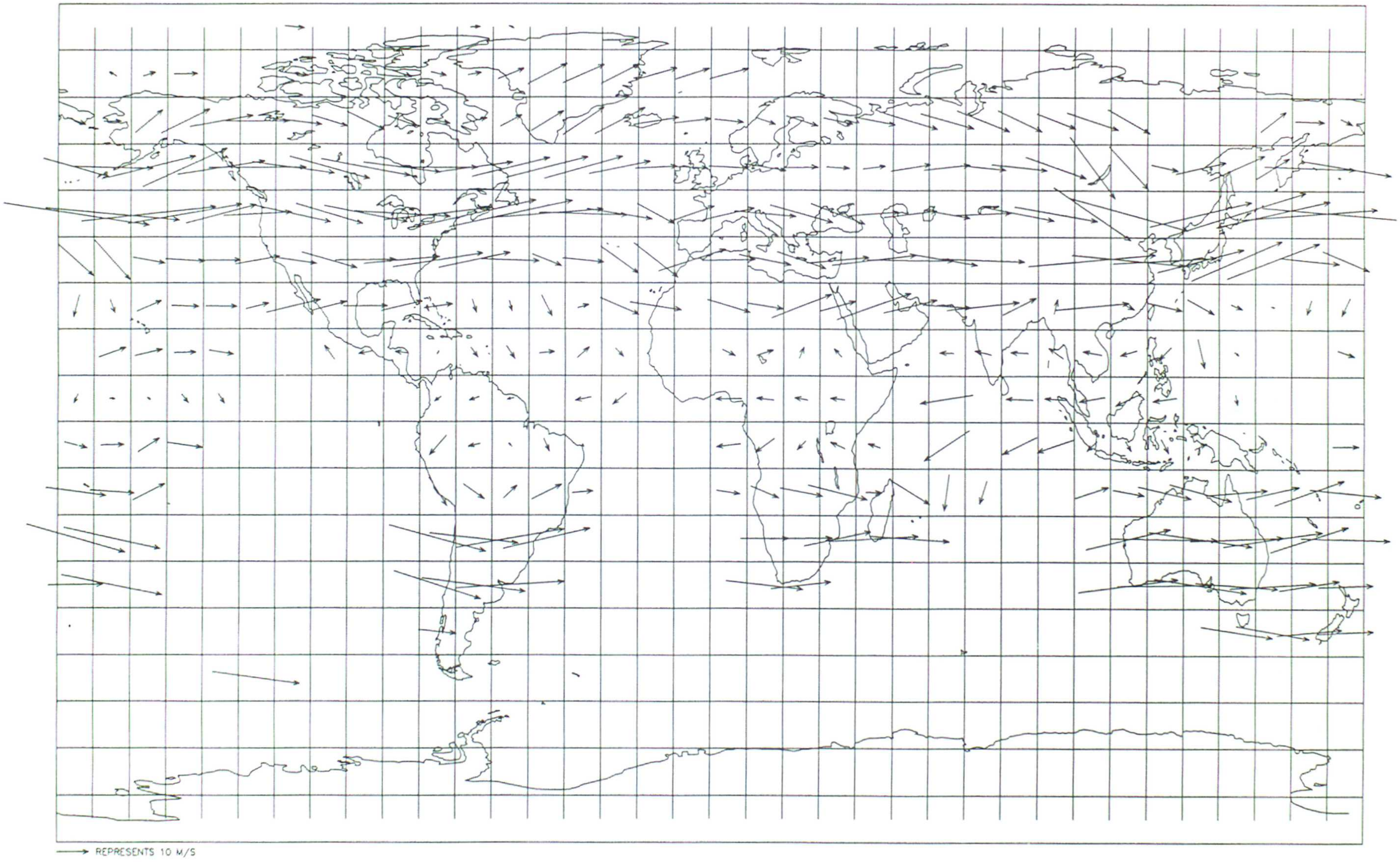
FIGURE 3

OCTOBER 1999

OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED


0 0 0 4 0 3 1 1 0 1 0 0
0 1 2 3 0 8 7 16 10 14 6 8 3 1 0 0 0 0 0
3 8 14 40 16 12 7 4 3 10 19 23 44 101 130 128 97 66 52 46 10 10 16 13 13 11 9 3 4 4 1 1 2 2
22 28 25 68 123 75 41 42 22 11 41 81 123 201 232 248 261 677 975 672 88 42 19 13 3 4 6 2 2 1 6 5 3 2 12 27
16 56 57 60 86 778 1357 1914 2188 2267 1159 211 106 117 123 116 134 440 3071 780 125 18 10 18 33 3 4 3 2 3 0 10 71 72 136 55
5 18 15 38 179 908 2548 3186 3118 2979 770 43 43 62 61 27 18 62 29 33 50 101 6 11 36 31 1 4 2 8 16 103 92 65 38
3 56 248 178 46 11 11 53 159 500 765 70 50 43 18 8 5 0 7 9 14 1 2 6 14 32 44 3 2 39 17 20 20 8 16 16
0 5 8 12 8 0 0 5 26 45 24 35 25 5 2 9 1 6 5 16 7 8 15 7 22 17 36 2 2 2 0 1 1
4 8 11 7 4 0 0 0 0 37 12 10 0 8 6 0 3 4 11 16 0 9 1 4 9 28 7 3 0 1 1 0 0
23 40 12 5 0 18 8 16 2 9 0 0 0 2 4 14 9 11 9 0 4 5 21 37 17 0 0 10
45 13 6 0 4 8 10 14 4 0 0 1 5 14 1 7 17 7 4 1 0 3 33 67 54 19 2 9 35
24 10 0 0 0 0 0 3 10 15 20 0 5 11 8 8 5 0 30 38 90 111 105 88 59
7 2 0 4 3 15 0 0 0 0 2 5 0 27 39 63 394 235 127 66
1 1 1 0 0 0 0 0 1 1 2 1 0 1 0 0 0 6 9 44 35
0 0 0 1 1 1 1 1 1 0 0 0 1 1
0 0 0 0 0 0 0 0 0 0 1
0

AIRCRAFT MEAN WINDS BETWEEN 70 AND 500 HPA FIGURE 4
OCTOBER 1999
OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT



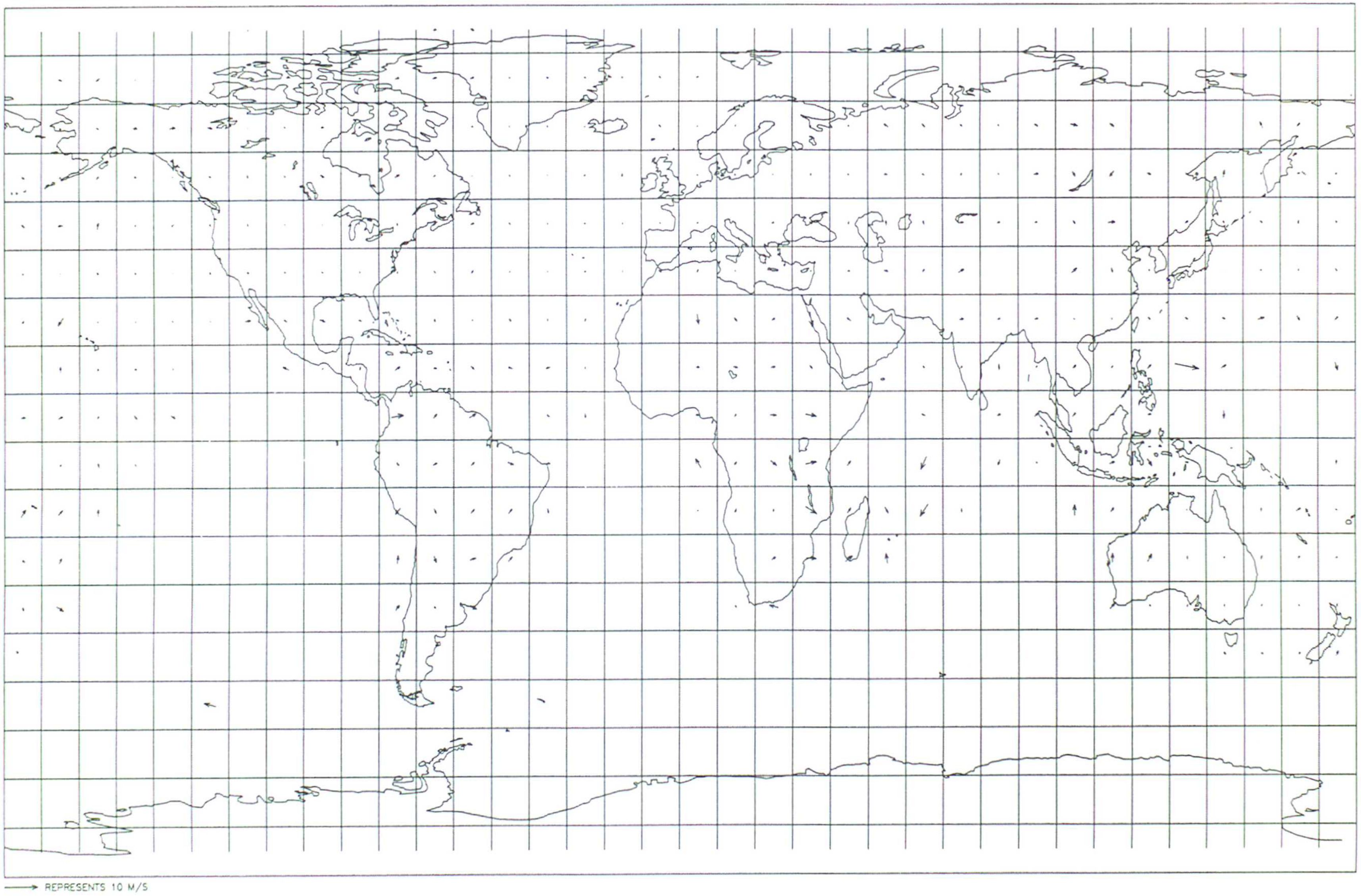
AIRCRAFT MEAN O-B WINDS BETWEEN 70 AND 500 HPA

OCTOBER 1999

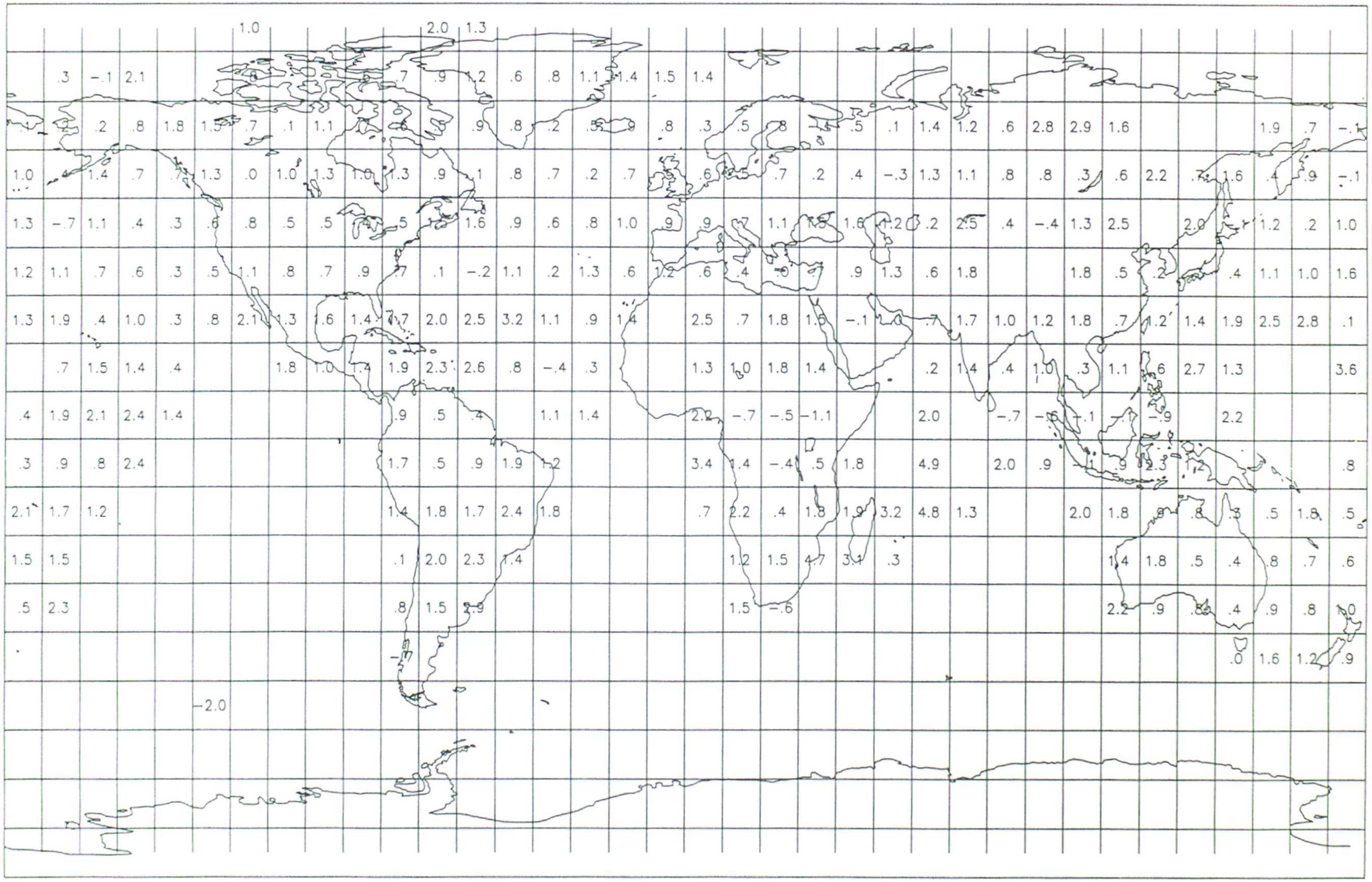
OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT

FIGURE 5



AIRCRAFT : MEAN O–B SPEEDS (M/S) BETWEEN 70 AND 500 HPA FIGURE 6
OCTOBER 1999
OBSERVATIONS WITH O–B VECTOR DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT


1.0 2.0 1.3
.3 −.1 2.1 .7 .9 1.2 .6 .8 1.1 1.4 1.5 1.4
.2 .8 1.8 1.5 .7 .1 1.1 .9 .8 .2 .5 .8 .3 .5 .8 .5 .1 1.4 1.2 .6 2.8 2.9 1.6 1.9 .7 −.1
1.0 1.4 .7 .7 1.3 .0 1.0 1.3 1.0 1.3 .9 .1 .8 .7 .2 .7 .6 .5 .7 .2 .4 −.3 1.3 1.1 .8 .8 .3 .6 2.2 .7 1.6 .4 .9 −.1
1.3 −.7 1.1 .4 .3 .6 .8 .5 .5 .5 1.6 .9 .6 .8 1.0 .9 .9 .7 1.1 1.5 1.6 1.2 .2 2.5 .4 −.4 1.3 2.5 2.0 1.2 .2 1.0
1.2 1.1 .7 .6 .3 .5 1.1 .8 .7 .9 .7 .1 −.2 1.1 .2 1.3 .6 1.2 .6 .4 .0 .9 1.3 .6 1.8 1.8 .5 .2 .4 1.1 1.0 1.6
1.3 1.9 .4 1.0 .3 .8 2.1 1.3 1.6 1.4 1.7 2.0 2.5 3.2 1.1 .9 1.4 2.5 .7 1.8 1.5 −.1 1.0 .7 1.7 1.0 1.2 1.8 .7 1.2 1.4 1.9 2.5 2.8 .1
.7 1.5 1.4 .4 1.8 1.0 .4 1.9 2.3 2.6 .8 −.4 .3 1.3 1.0 1.8 1.4 .2 1.4 .4 1.0 .3 1.1 .6 2.7 1.3 3.6
.4 1.9 2.1 2.4 1.4 .9 .5 .4 1.1 1.4 2.2 −.7 −.5 −1.1 2.0 −.7 −.6 −.1 −.1 −.9 2.2
.3 .9 .8 2.4 1.7 .5 .9 1.9 1.2 3.4 1.4 −.4 .5 1.8 4.9 2.0 .9 −.1 .9 2.3 1.2 .8
2.1 1.7 1.2 1.4 1.8 1.7 2.4 1.8 .7 2.2 .4 1.8 1.9 3.2 4.8 1.3 2.0 1.8 .9 .8 .3 .5 1.8 .5
1.5 1.5 .1 2.0 2.3 1.4 1.2 1.5 4.7 3.1 .3 1.4 1.8 .5 .4 .8 .7 .6
.5 2.3 .8 1.5 2.9 1.5 −.6 2.2 .9 .8 .4 .9 .8 1.0
−.7 .0 1.6 1.2 .9
−2.0

AIRCRAFT : RMS O-B VECTOR (M/S) BETWEEN 70 AND 500 HPA FIGURE 7
OCTOBER 1999
OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

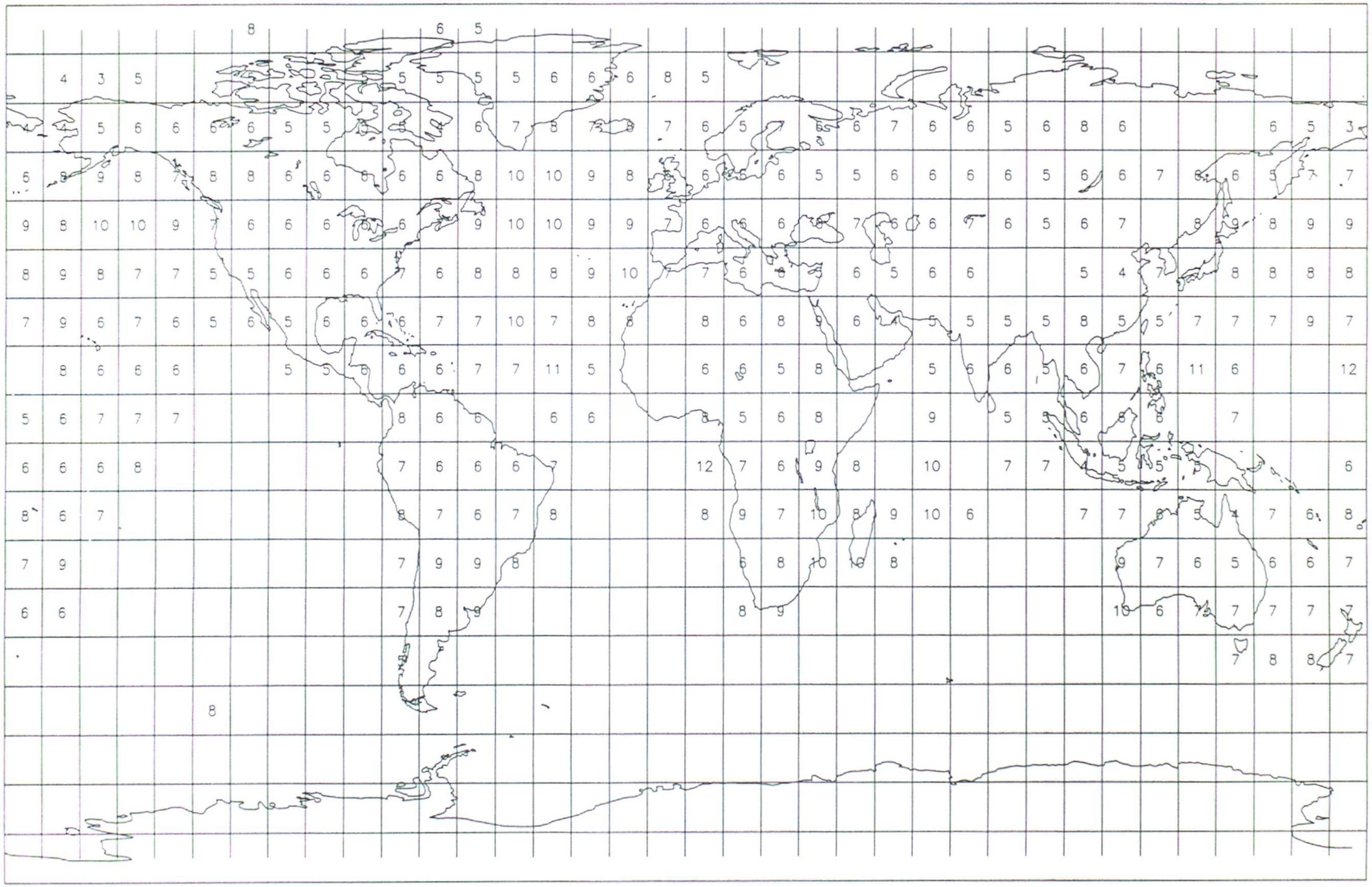

8 6 5
4 3 5 5 5 5 5 6 6 6 8 5
4 5 6 6 6 6 5 5 4 6 7 8 7 8 7 6 5 7 6 5 6 7 6 6 5 6 8 6 6 5 3
6 8 9 8 7 8 8 6 6 6 6 6 8 10 10 9 8 6 6 6 5 5 6 6 6 6 5 6 6 7 6 6 5 7 7
9 8 10 10 9 7 6 6 6 6 6 9 10 10 9 9 7 6 6 6 6 7 6 6 6 7 6 5 6 7 8 9 8 9 9
8 9 8 7 7 5 5 6 6 6 7 6 8 8 8 9 10 7 7 6 6 6 6 5 6 6 5 4 7 8 8 8 8
7 9 6 7 6 5 6 5 6 6 6 7 7 10 7 8 8 8 6 8 9 6 5 5 5 5 8 5 5 7 7 7 9 7
8 6 6 6 5 5 6 6 6 7 7 11 5 6 6 5 8 5 6 6 6 7 6 11 6 12
5 6 7 7 7 8 6 6 6 6 8 5 6 8 9 5 5 6 6 6 7
6 6 6 8 7 6 6 6 7 12 7 6 9 8 10 7 7 4 5 5 5 6
8 6 7 8 7 6 7 8 8 9 7 10 8 9 10 6 7 7 8 5 4 7 6 8
7 9 7 9 9 8 6 8 10 10 8 9 7 6 5 6 6 7
6 6 7 8 9 8 9 10 6 7 7 7 7 7
7 8 8 7
8

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: October 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 30.0 hPa
Element monitored		:GEOPOTENTIAL HEIGHT IN metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown duringperiod.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.1	
SELECTION CRITERIA	: ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.	

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
42027	12	Z	1000	34/ 75	19	0	18.6	-50.1	53.4	6
42339	12	Z	150	26/ 73	11	0	102.1	64.5	120.7	5
42361	00	Z	100	26/ 78	10	0	51.6	163.3	171.3	4
42379	00	Z	300	27/ 83	23	0	31.3	70.8	77.4	7
42379	12	Z	100	27/ 83	20	0	93.5	90.9	130.4	4
42492	12	Z	150	26/ 85	15	0	95.6	52.5	109.0	6
42647	12	Z	100	23/ 73	11	1	76.9	177.5	193.4	6
42809	00	Z	150	23/ 88	26	1	89.5	44.7	100.1	4
42971	00	Z	200	20/ 86	16	1	67.3	76.2	101.6	5
43003	12	Z	150	19/ 73	14	12	77.0	198.1	212.6	7
43014	00	Z	100	20/ 75	9	1	102.3	127.8	163.7	4
43014	12	Z	100	20/ 75	9	1	77.4	167.2	184.3	5
43041	12	Z	150	19/ 82	16	0	102.0	32.8	107.1	4
43192	00	Z	300	15/ 74	17	0	55.1	-61.6	82.6	5
43285	12	Z	100	13/ 75	13	0	89.9	83.3	122.5	6
43369	00	Z	100	8/ 73	23	0	76.1	-144.4	163.2	5
56739	12	Z	1000	25/ 98	29	0	9.5	81.4	82.0	4
78762	12	Z	1000	10/ -84	21	0	14.4	44.3	46.6	5
84628	12	Z	850	-12/ -77	12	0	6.5	-79.1	79.4	8
89009	00	Z	850	-90/ 0	1	22	0.0	56.0	56.0	5
89642	00	Z	300	-67/ 140	28	0	15.0	68.4	70.0	4
89664	00	Z	400	-78/ 167	25	0	39.8	55.9	68.6	6
96935	00	Z	150	-7/ 113	11	0	90.2	15.1	91.4	5
97372	00	Z	250	-10/ 124	16	0	71.9	67.6	98.7	8

AVAILABILITY – TEMP – 500 HPA GEOPOTENTIAL – OCTOBER 1999

FIGURE 8

ALL HOURS

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS – 1080

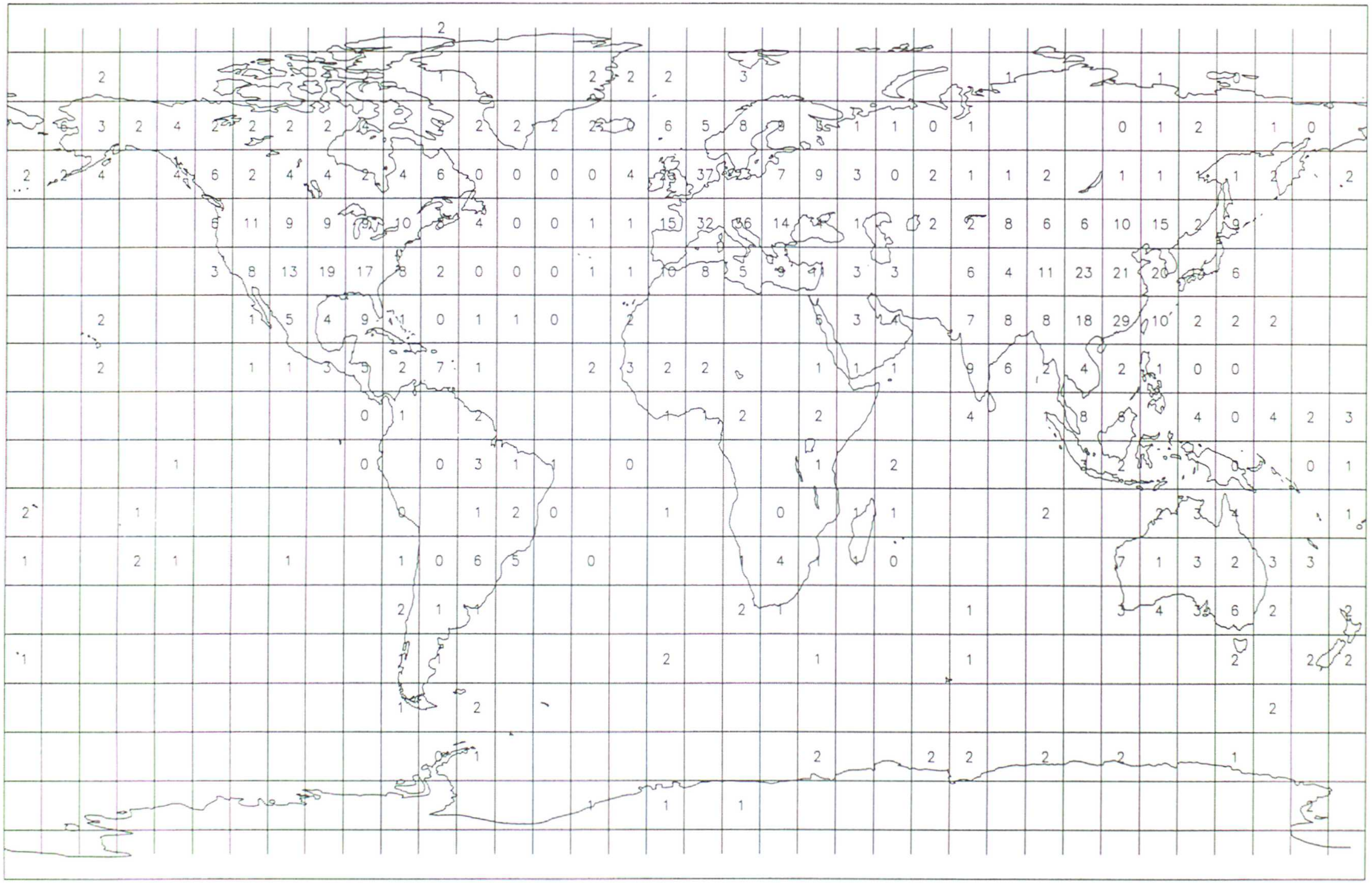

2
2 1 2 2 2 3 1 1
6 3 2 4 2 2 2 2 4 2 2 2 2 6 5 8 9 5 1 1 0 1 0 1 2 1 0
2 2 4 4 6 2 4 4 2 4 6 0 0 0 0 4 23 37 7 9 3 0 2 1 1 2 1 1 1 1 2 2
6 11 9 9 9 10 8 4 0 0 1 1 15 32 36 14 4 1 2 2 8 6 6 10 15 2 9
3 8 13 19 17 8 2 0 0 0 1 1 10 8 5 9 4 3 3 6 4 11 23 21 20 6
2 1 5 4 9 1 0 1 1 0 2 5 3 4 7 8 8 18 29 10 2 2 2
2 1 1 3 5 2 7 1 2 3 2 2 1 1 1 9 6 2 4 2 1 0 0
0 1 2 1 1 2 2 4 1 8 8 4 0 4 2 3
1 0 0 3 1 1 0 0 1 2 3 2 1 0 0 1
2 1 0 1 2 0 1 1 0 1 1 2 2 3 4 1 1
1 2 1 1 1 0 6 5 0 1 4 1 1 0 7 1 3 2 3 3
2 1 1 2 1 1 3 4 3 6 2 2
1 2 2 1 1 1 2 2 2 2
1 2 2
1 2 2 2 2 2 1
1 1 1 2

TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: October 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 100.0 hPa
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored		
	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.2	
SELECTION CRITERIA	: $\geq$ 10 observations and $\geq$ 15 m s^{-1} RMS vector wind.	

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
60360	12	V	100	37/ 8	18	0	11	5.0	-1.7	15.5	1
67197	00	V	300	-25/ 47	11	0	9	4.5	-2.3	16.5	1
71917	12	V	250	80/ -86	25	0	16	5.3	-4.8	17.2	1

AVAILABILITY – TEMP/PILOT – 300 HPA WIND – OCTOBER 1999 FIGURE 9
ALL HOURS
10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS
GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS – 1187

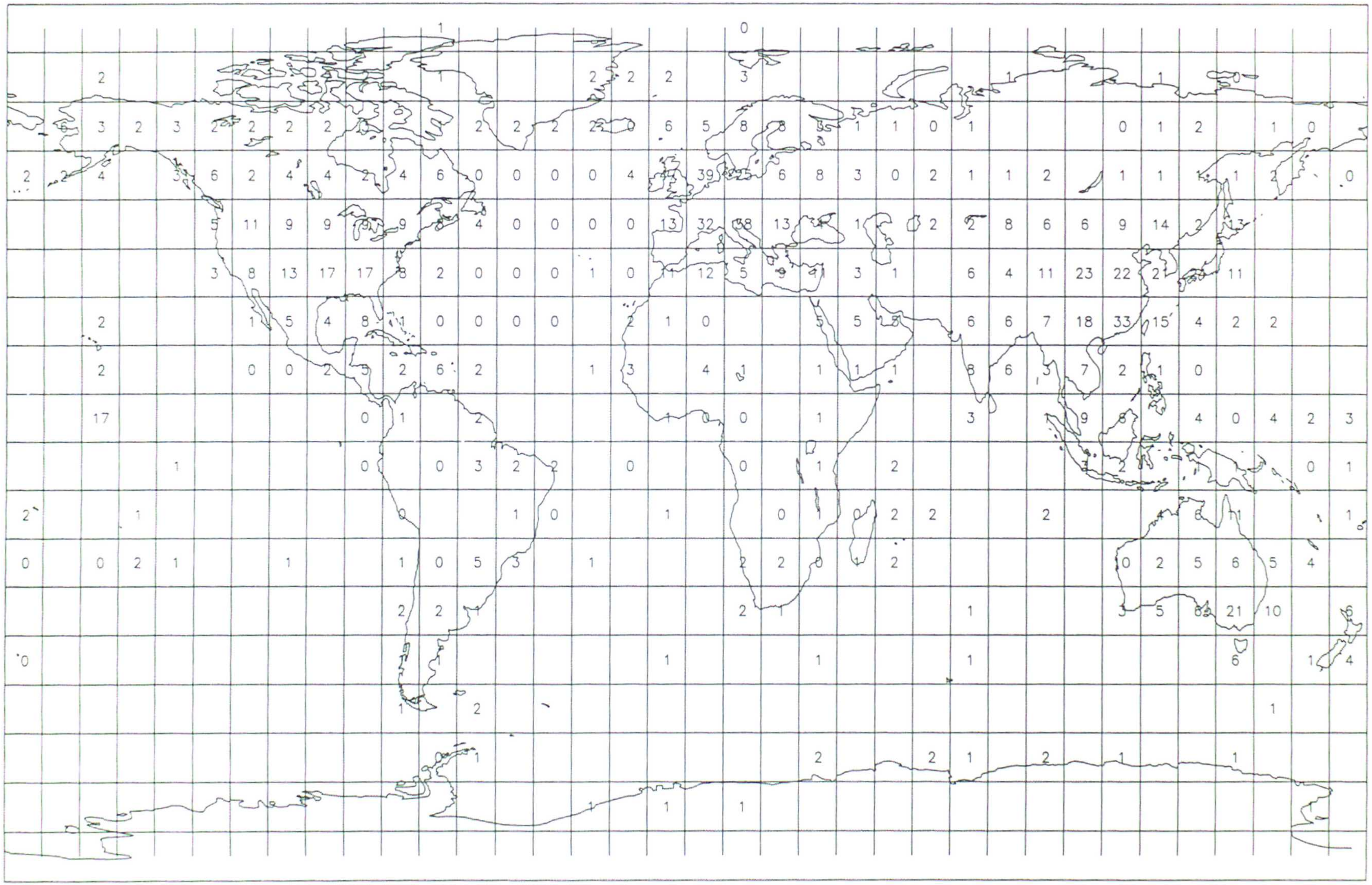

1 0
2 1 2 2 2 3 1 1
6 3 2 3 2 2 2 2 2 2 2 2 6 5 8 8 1 1 0 1 0 1 2 1 0
2 2 4 3 6 2 4 4 2 4 6 0 0 0 0 4 39 6 8 3 0 2 1 1 2 1 1 1 1 2 0
5 11 9 9 9 9 4 0 0 0 0 13 32 38 13 1 2 2 8 6 6 9 14 2 13
3 8 13 17 17 8 2 0 0 0 1 0 11 12 5 9 41 3 1 6 4 11 23 22 21 11
2 1 5 4 8 1 0 0 0 0 2 1 0 5 5 5 6 6 7 18 33 15 4 2 2
2 0 0 2 5 2 6 2 1 3 4 1 1 1 1 8 6 3 7 2 1 0
17 0 1 2 1 0 0 1 3 1 9 8 4 0 4 2 3
1 0 0 3 2 2 0 0 1 2 2 0 1
2 1 0 1 0 1 0 1 2 2 2 6 11 1
0 0 2 1 1 1 0 5 3 1 2 2 0 2 0 2 5 6 5 4
2 2 1 2 1 1 3 5 21 10 6
0 1 1 1 6 1 4
1 2 1
1 2 2 1 2 1 1
1 1 1

TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: October 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 500.0 - 150.0 hPa

Element monitored :WIND DIRECTION in degrees

Parameters monitored

:NUM OBS :Average number of observations at all levels.

:BIAS :Mean difference of observations from background values from all levels.

:MAX SPREAD :(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels

:SD :SD of difference of observations from background values at all levels.

SELECTION CRITERIA :NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
17240	12	DD	38/ 31	24	-11.9	4.0	12.9
17280	12	DD	38/ 40	23	-13.0	5.0	11.4
42361	12	DD	26/ 78	6	-11.3	4.3	8.9
48455	00	DD	14/ 101	17	17.4	7.7	24.4
62337	00	DD	31/ 34	30	-18.5	4.3	8.7
62337	12	DD	31/ 34	27	-21.6	2.7	8.1
68842	12	DD	-34/ 26	6	-14.9	7.3	15.1
80001	12	DD	13/ -82	14	21.9	6.8	23.6
89571	12	DD	-69/ 78	14	10.6	8.5	17.9

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: October 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from GOES, METEOSAT, GMS, INSAT.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :number of observations > 10.

Data Extracted :Layer 701 - 1000 hPa
401 - 700 hPa
101 - 400 hPa

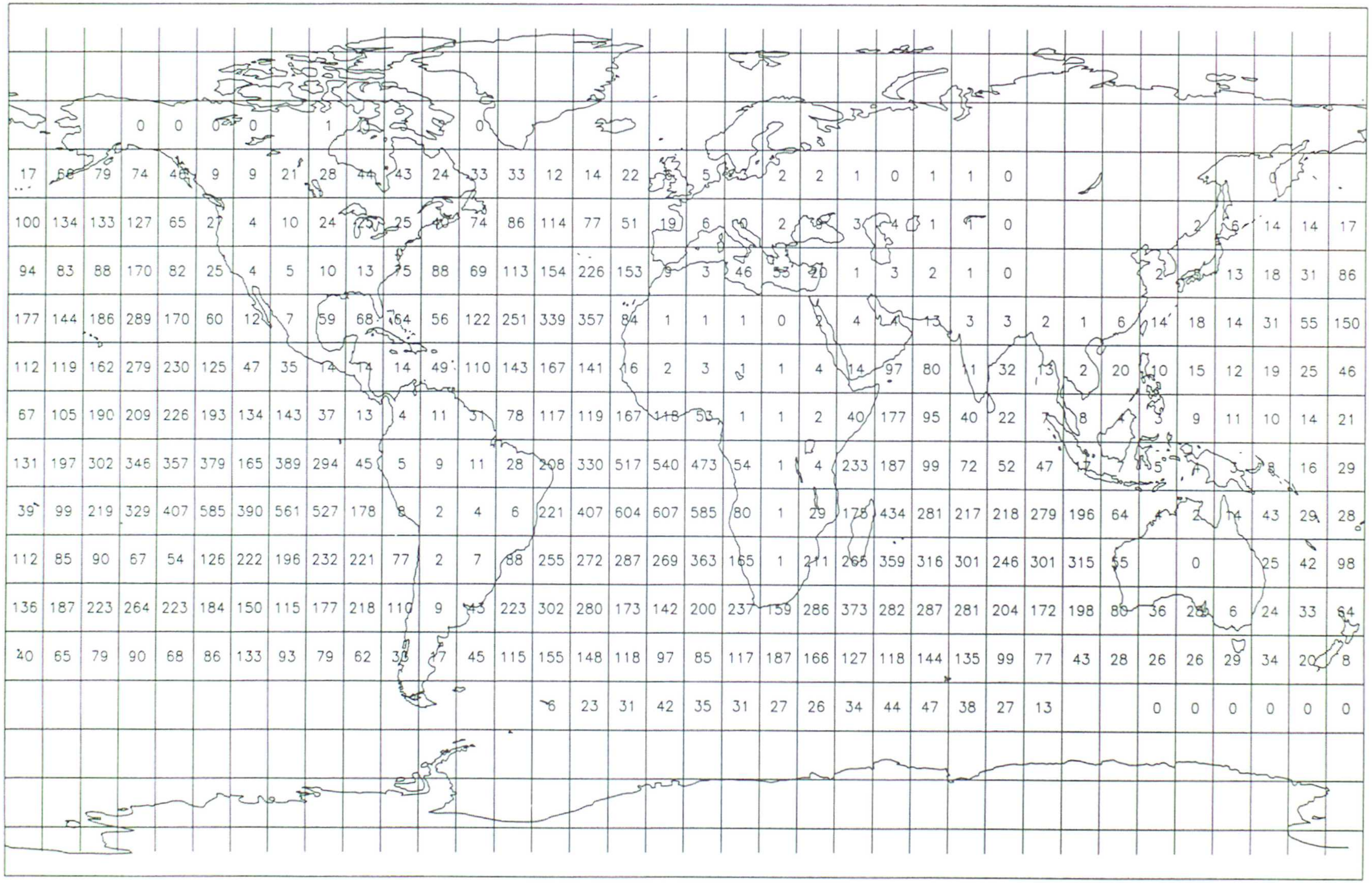
:Mean wind

:Mean observation minus background vector wind differences

:Mean observation minus background speed differences

:RMS of observation minus background vector differences

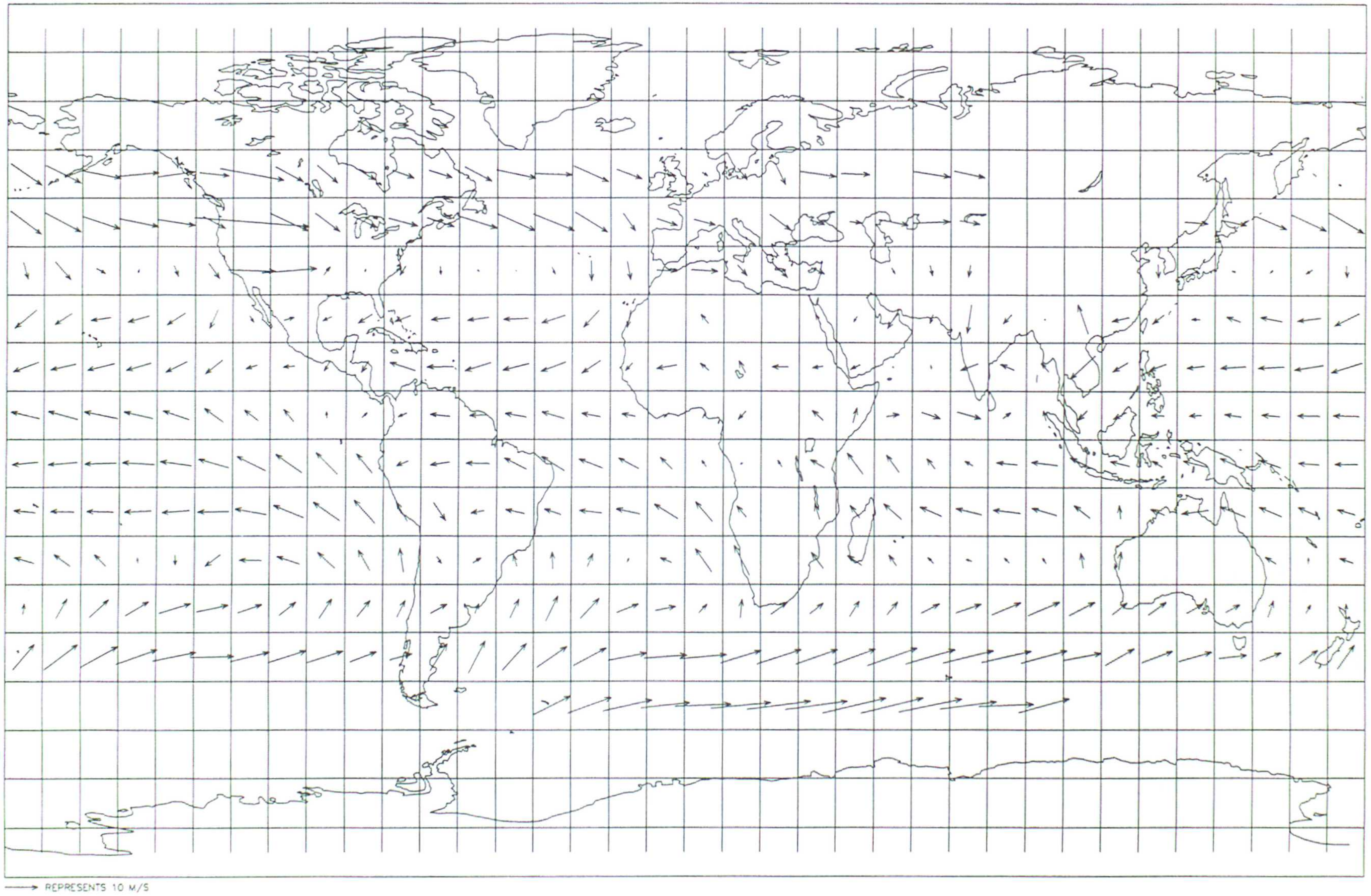
AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 701 AND 1000 HPA FIGURE 10
OCTOBER 1999


0 0 0 0 1 0
17 68 79 74 46 9 9 21 28 44 43 24 33 33 12 14 22 5 2 2 1 0 1 1 0
100 134 133 127 65 27 4 10 24 25 25 74 86 114 77 51 19 6 2 3 4 1 1 0 2 5 14 14 17
94 83 88 170 82 25 4 5 10 13 75 88 69 113 154 226 153 9 3 46 53 20 1 3 2 1 0 2 13 18 31 86
177 144 186 289 170 60 12 7 59 68 64 56 122 251 339 357 84 1 1 1 0 2 4 4 13 3 3 2 1 6 14 18 14 31 55 150
112 119 162 279 230 125 47 35 14 14 14 49 110 143 167 141 16 2 3 1 1 4 14 97 80 11 32 13 2 20 10 15 12 19 25 46
67 105 190 209 226 193 134 143 37 13 4 11 31 78 117 119 167 118 53 1 1 2 40 177 95 40 22 7 8 4 3 9 11 10 14 21
131 197 302 346 357 379 165 389 294 45 5 9 11 28 208 330 517 540 473 54 1 4 233 187 99 72 52 47 17 7 5 4 3 8 16 29
39 99 219 329 407 585 390 561 527 178 8 2 4 6 221 407 604 607 585 80 1 29 175 434 281 217 218 279 196 64 4 2 14 43 29 28
112 85 90 67 54 126 222 196 232 221 77 2 7 88 255 272 287 269 363 165 1 211 265 359 316 301 246 301 315 55 0 25 42 98
136 187 223 264 223 184 150 115 177 218 110 9 43 223 302 280 173 142 200 237 159 286 373 282 287 281 204 172 198 80 36 26 6 24 33 64
40 65 79 90 68 86 133 93 79 62 30 17 45 115 155 148 118 97 85 117 187 166 127 118 144 135 99 77 43 28 26 26 29 34 20 8
6 23 31 42 35 31 27 26 34 44 47 38 27 13 0 0 0 0 0 0

SATOB METEOSAT W/V VECTOR MEAN WINDS BETWEEN 701–1000 HPA

FIGURE 11

OCTOBER 1999
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 10 M/S

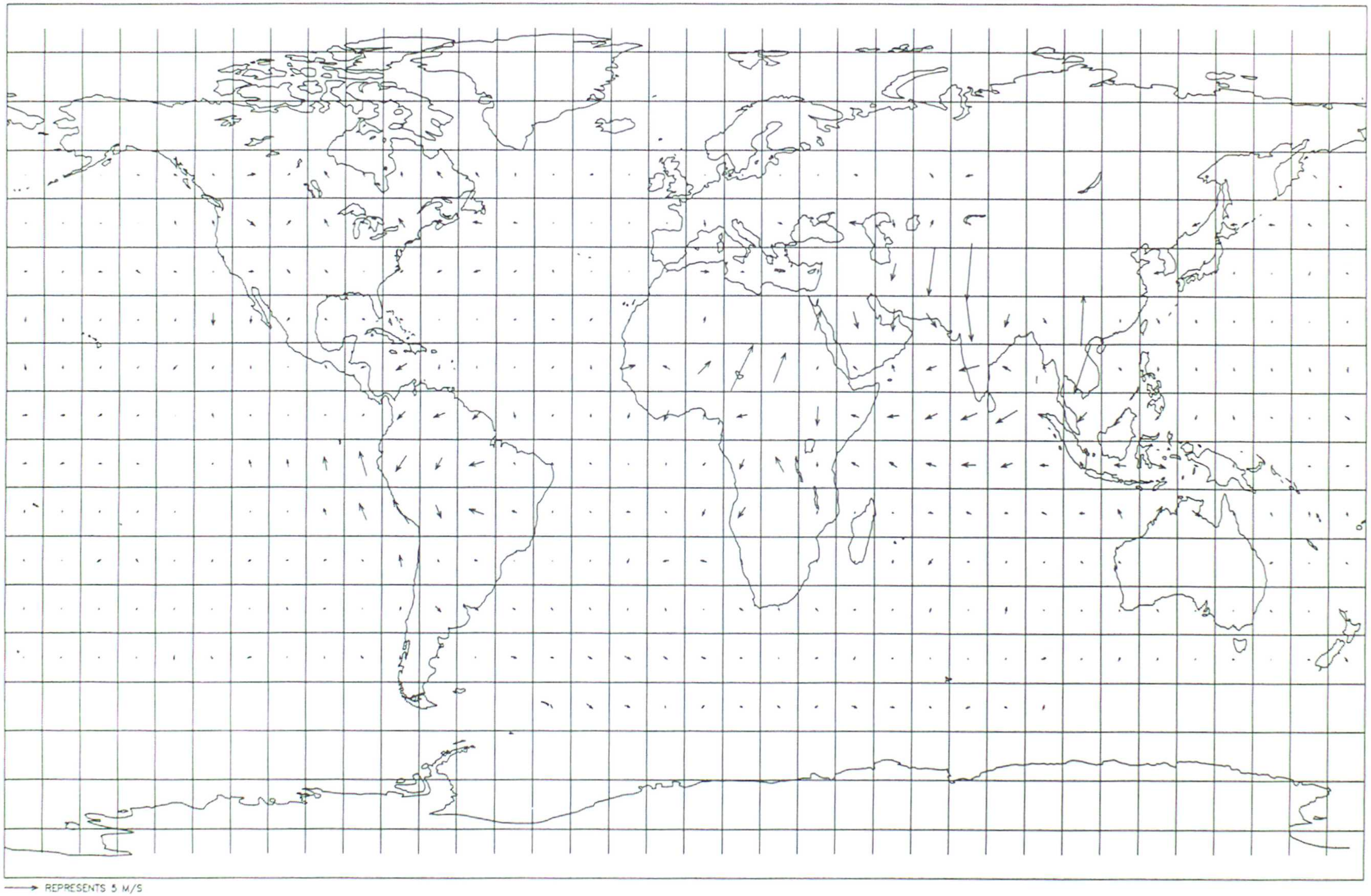
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 701-1000 HPA

OCTOBER 1999

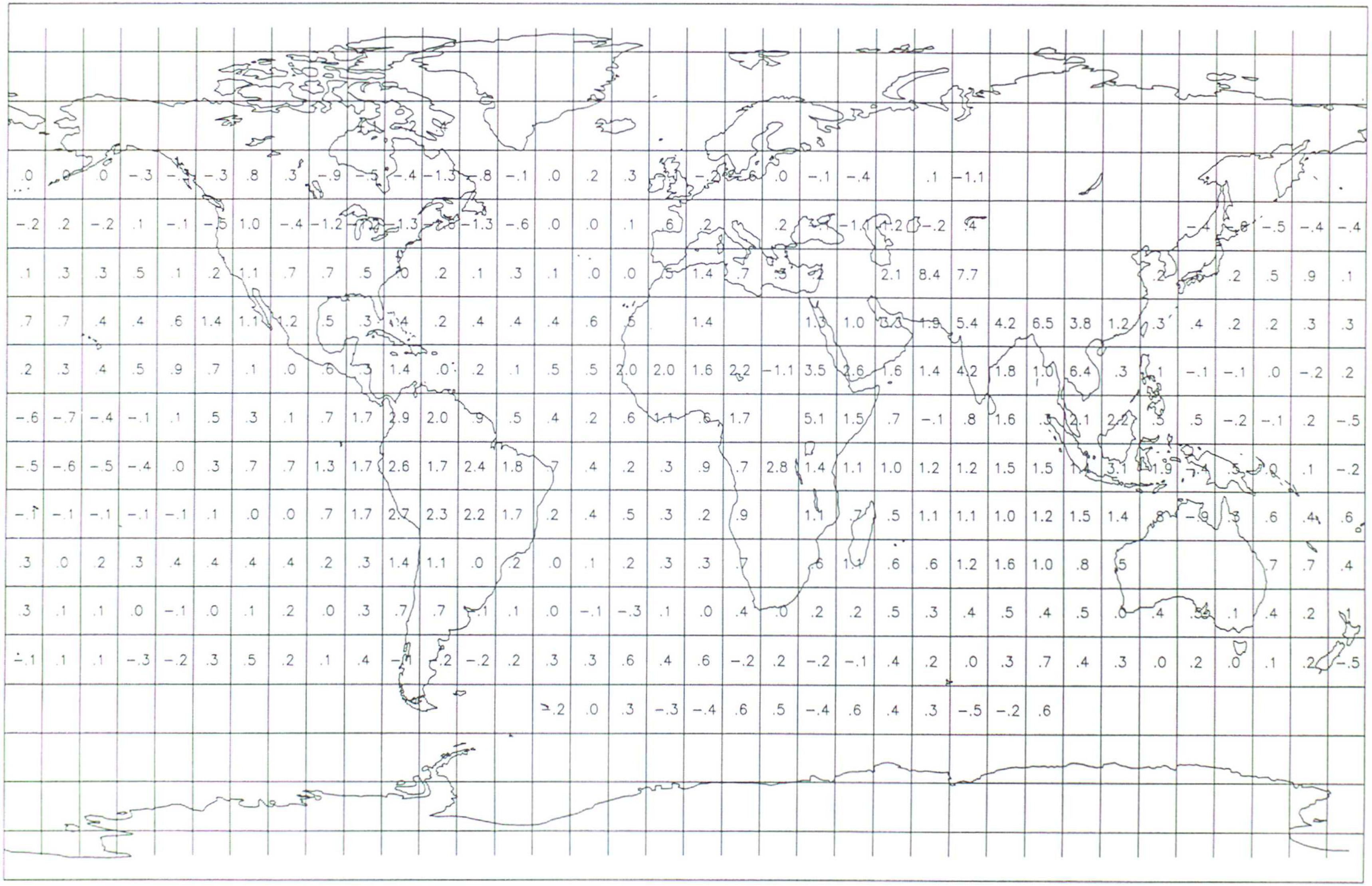
ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

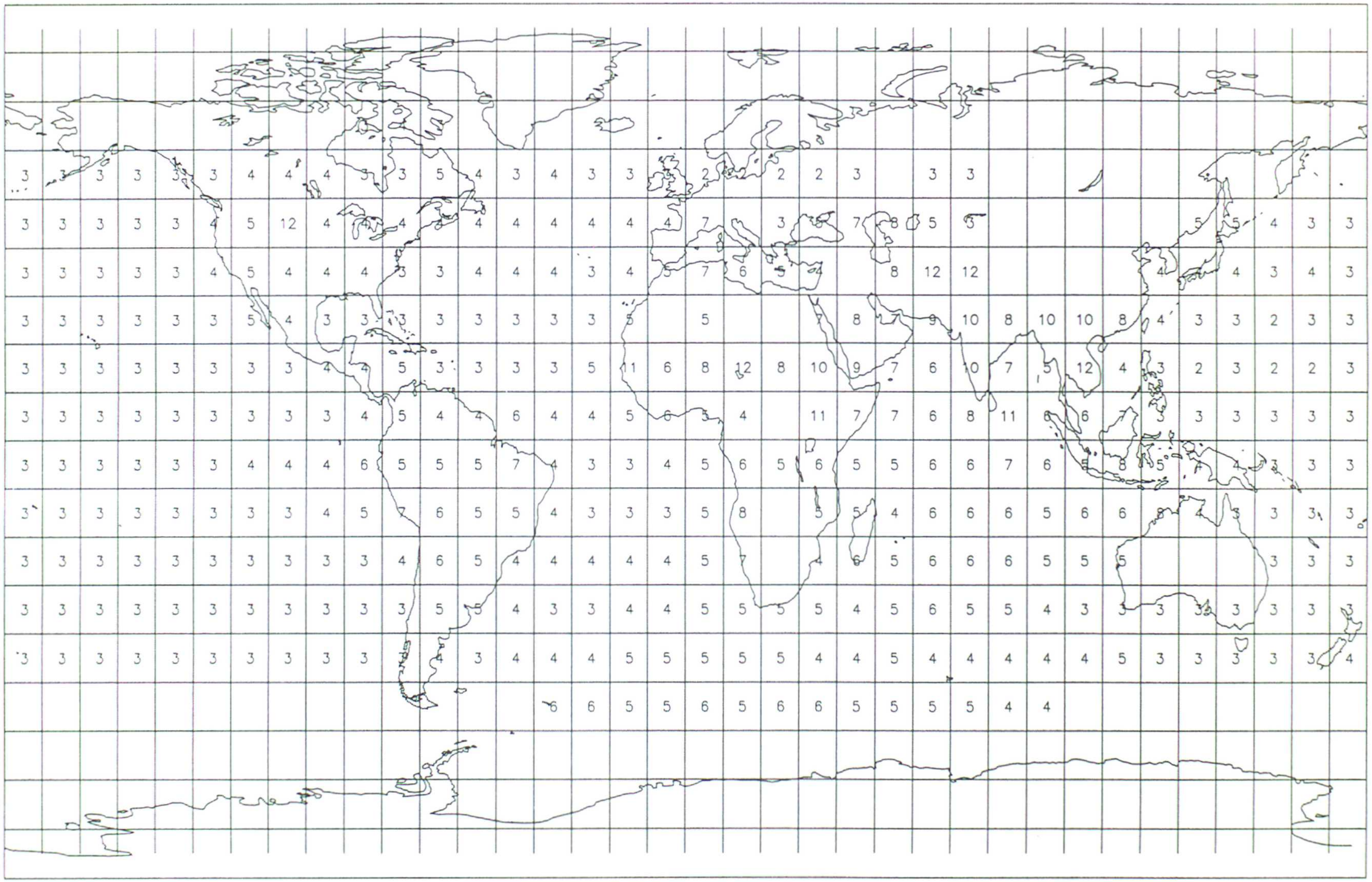
FIGURE 12



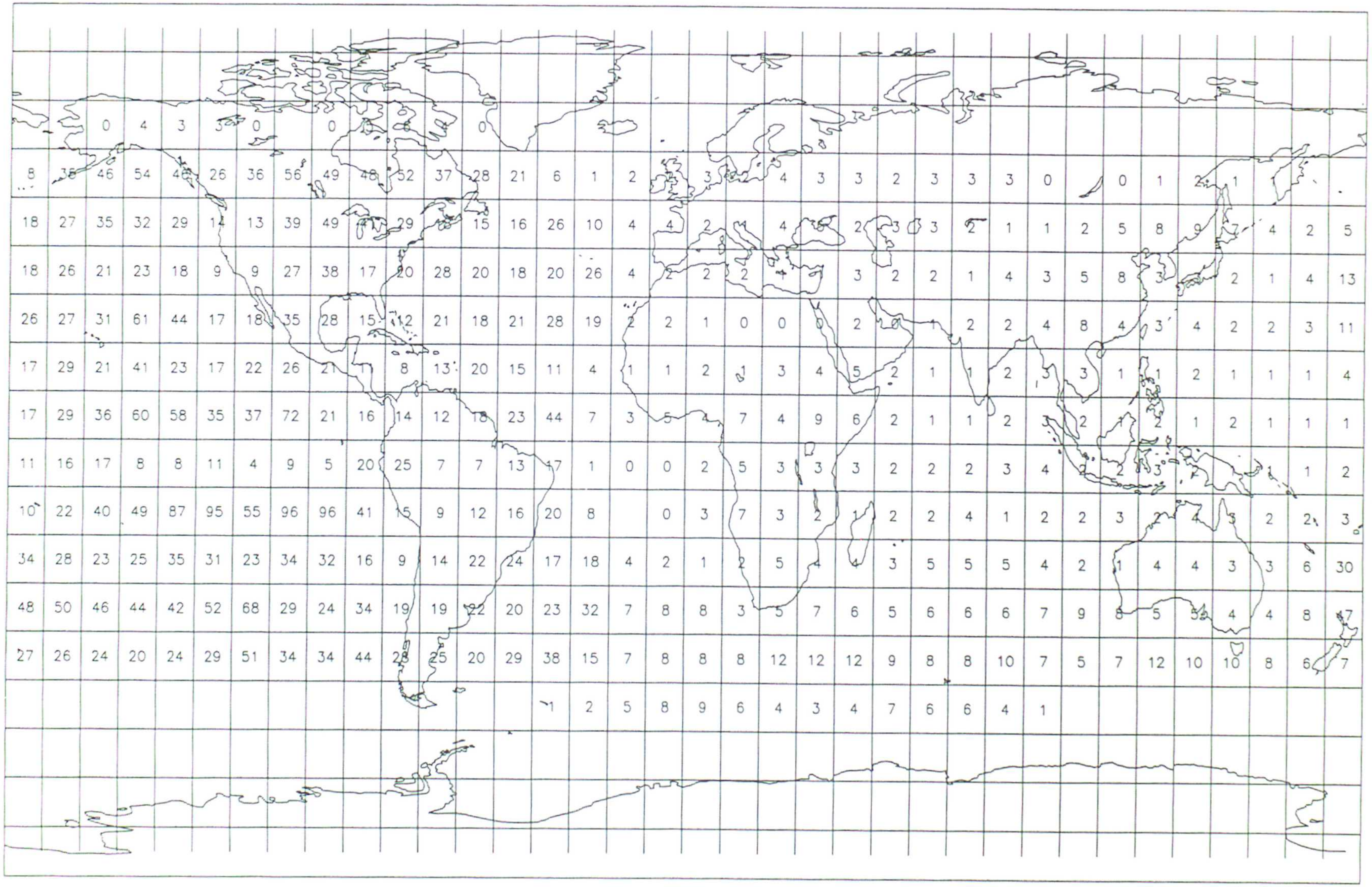
SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 13
OCTOBER 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


.0 .0 .0 -.3 -.3 .8 .3 -.9 -.5 -.4 -1.3 -.8 -.1 .0 .2 .3 -.2 -.6 .0 -.1 -.4 .1 -1.1
-.2 .2 -.2 .1 -.1 -.5 1.0 -.4 -1.2 -1.3 -1.3 -.6 .0 .0 .1 .6 .2 .2 -1.1 -1.2 -.2 .4 -.4 -.8 -.5 -.4 -.4
.1 .3 .3 .5 .1 .2 1.1 .7 .7 .5 .0 .2 .1 .3 .1 .0 .0 .5 1.4 .7 .3 .2 2.1 8.4 7.7 .2 .2 .5 .9 .1
.7 .7 .4 .4 .6 1.4 1.1 1.2 .5 .3 .4 .2 .4 .4 .4 .6 .5 1.4 1.3 1.0 3.3 1.9 5.4 4.2 6.5 3.8 1.2 .3 .4 .2 .2 .3 .3
.2 .3 .4 .5 .9 .7 .1 .0 .6 .3 1.4 .0 .2 .1 .5 .5 2.0 2.0 1.6 2.2 -1.1 3.5 2.6 1.6 1.4 4.2 1.8 1.0 6.4 .3 .1 -.1 -.1 .0 -.2 .2
-.6 -.7 -.4 -.1 .1 .5 .3 .1 .7 1.7 2.9 2.0 .9 .5 .4 .2 .6 1.1 .6 1.7 5.1 1.5 .7 -.1 .8 1.6 .3 2.1 2.2 .5 .5 -.2 -.1 .2 -.5
-.5 -.6 -.5 -.4 .0 .3 .7 .7 1.3 1.7 2.6 1.7 2.4 1.8 .7 .4 .2 .3 .9 .7 2.8 1.4 1.1 1.0 1.2 1.2 1.5 1.5 1.4 3.1 1.9 .7 .5 .0 .1 -.2
-.1 -.1 -.1 -.1 -.1 .1 .0 .0 .7 1.7 2.7 2.3 2.2 1.7 .2 .4 .5 .3 .2 .9 1.1 .7 .5 1.1 1.1 1.0 1.2 1.5 1.4 .8 -.9 .3 .6 .4 .6
.3 .0 .2 .3 .4 .4 .4 .4 .2 .3 1.4 1.1 .0 .2 .0 .1 .2 .3 .3 .7 .6 1.1 .6 .6 1.2 1.6 1.0 .8 .5 .7 .7 .4
.3 .1 .1 .0 -.1 .0 .1 .2 .0 .3 .7 .7 .1 .1 .0 -.1 -.3 .1 .0 .4 .0 .2 .2 .5 .3 .4 .5 .4 .5 .0 .4 .5 .1 .4 .2 .1
-.1 .1 .1 -.3 -.2 .3 .5 .2 .1 .4 -.1 .2 -.2 .2 .3 .3 .6 .4 .6 -.2 .2 -.2 -.1 .4 .2 .0 .3 .7 .4 .3 .0 .2 .0 .1 .2 -.5
.2 .0 .3 -.3 -.4 .6 .5 -.4 .6 .4 .3 -.5 -.2 .6

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 14
OCTOBER 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT

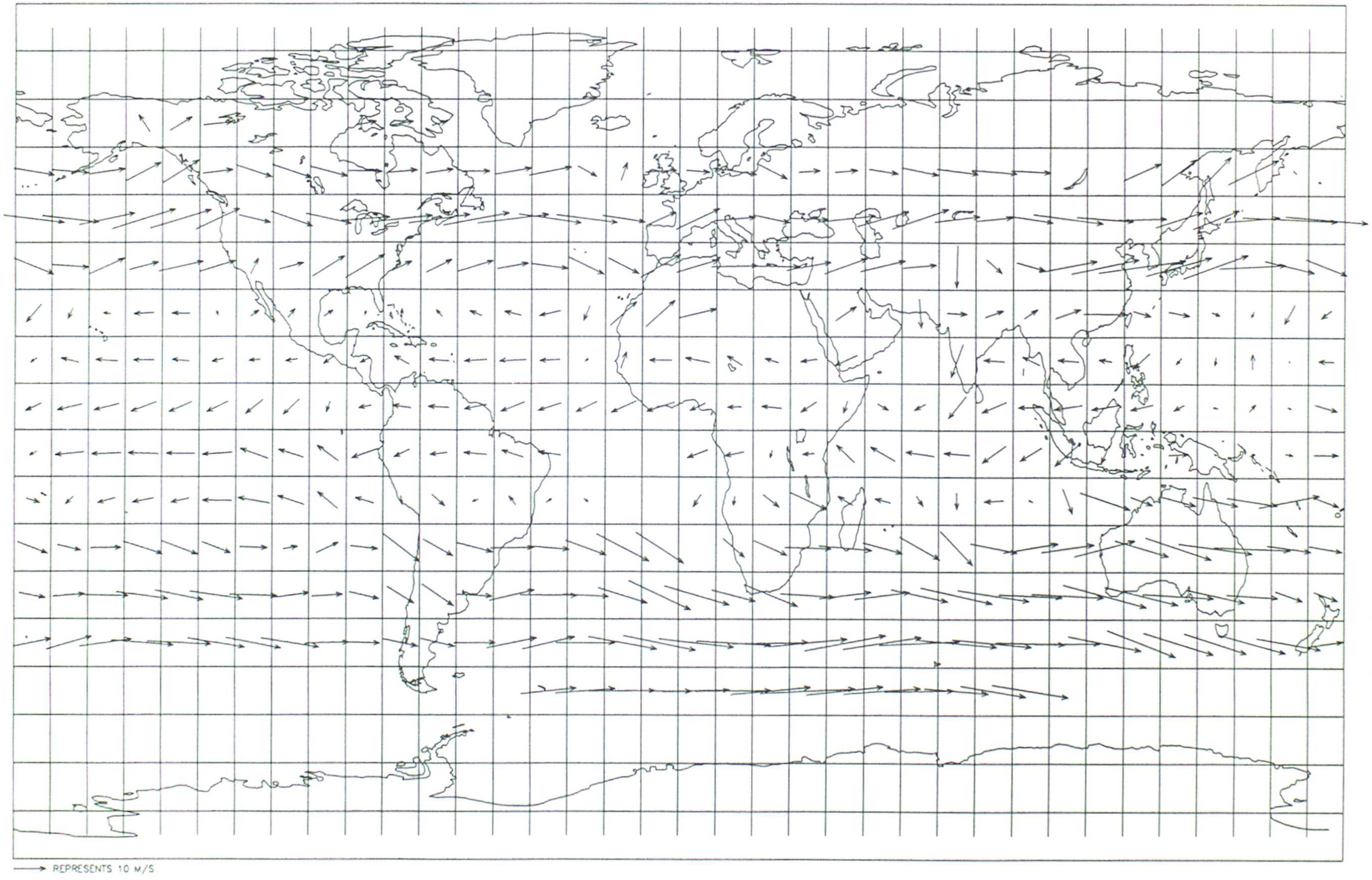


AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 401 AND 700 HPA FIGURE 15
OCTOBER 1999


0 4 3 3 0 0 0 0 0
8 36 46 54 46 26 36 56 49 48 52 37 28 21 6 1 2 2 3 2 4 3 3 2 3 3 3 0 0 1 2 1 1
18 27 35 32 29 14 13 39 49 41 29 18 15 16 26 10 4 4 2 1 4 5 2 3 3 2 1 1 2 5 8 9 7 4 2 5
18 26 21 23 18 9 9 27 38 17 20 28 20 18 20 26 4 2 2 2 1 1 3 2 2 1 4 3 5 8 3 2 1 4 13
26 27 31 61 44 17 18 35 28 15 12 21 18 21 28 19 2 2 1 0 0 0 2 0 1 2 2 4 8 4 3 4 2 2 3 11
17 29 21 41 23 17 22 26 21 11 8 13 20 15 11 4 1 1 2 1 3 4 5 2 1 1 2 3 3 1 1 2 1 1 1 4
17 29 36 60 58 35 37 72 21 16 14 12 18 23 44 7 3 5 4 7 4 9 6 2 1 1 2 3 2 1 2 1 2 1 1 1
11 16 17 8 8 11 4 9 5 20 25 7 7 13 17 1 0 0 2 5 3 3 3 2 2 2 3 4 2 2 3 2 1 1 1 2
10 22 40 49 87 95 55 96 96 41 15 9 12 16 20 8 0 3 7 3 2 1 2 2 4 1 2 2 3 2 4 3 2 2 3
34 28 23 25 35 31 23 34 32 16 9 14 22 24 17 18 4 2 1 2 5 4 4 3 5 5 5 4 2 1 4 4 3 3 6 30
48 50 46 44 42 52 68 29 24 34 19 19 22 20 23 32 7 8 8 3 5 7 6 5 6 6 6 7 9 8 5 5 4 4 8 47
27 26 24 20 24 29 51 34 34 44 28 25 20 29 38 15 7 8 8 8 12 12 12 9 8 8 10 7 5 7 12 10 10 8 6 7
1 2 5 8 9 6 4 3 4 7 6 6 4 1

SATOB VECTOR MEAN WINDS BETWEEN 401–700 HPA
OCTOBER 1999
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

FIGURE 16


→ REPRESENTS 10 M/S

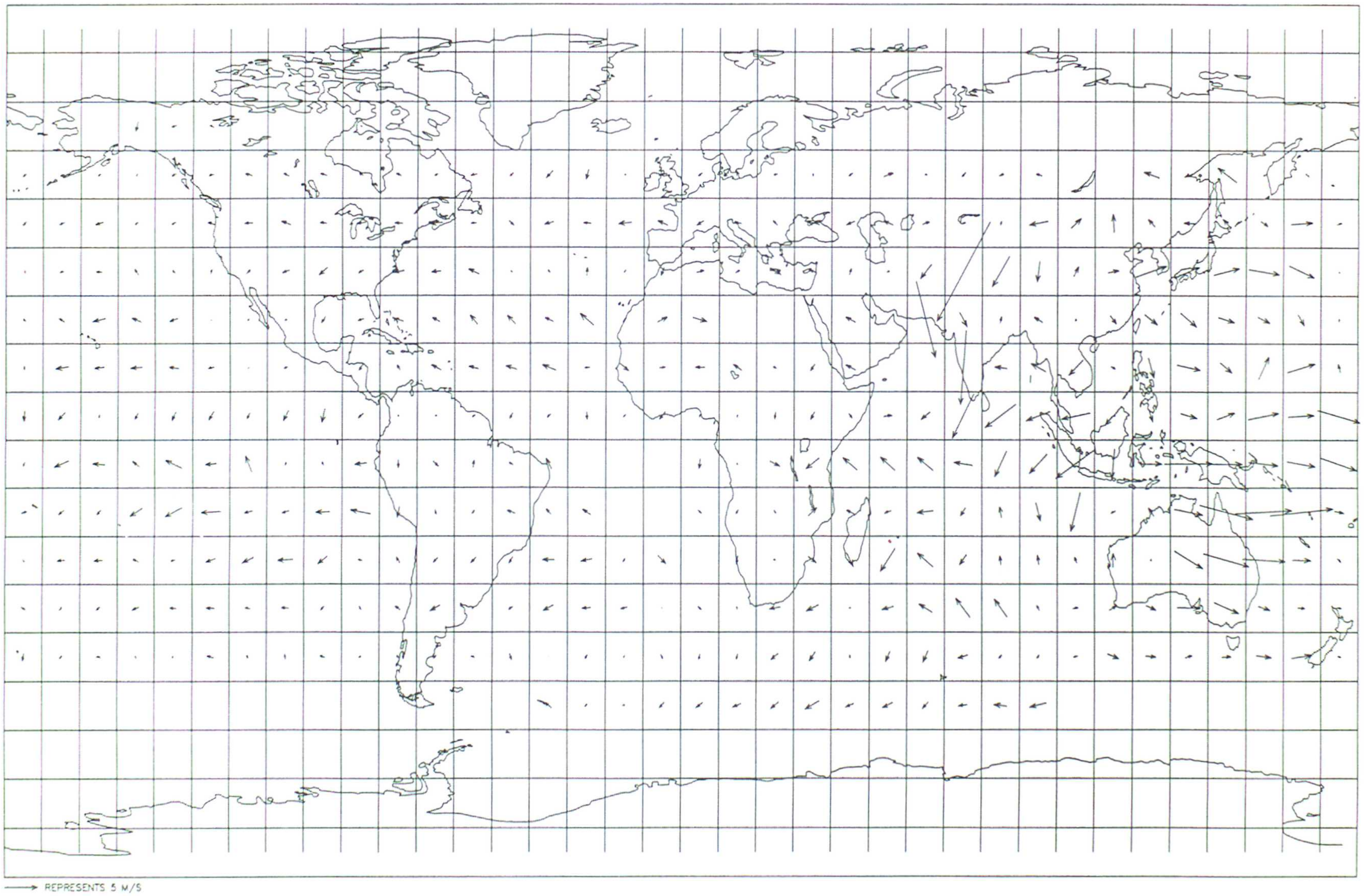
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 401–700 HPA

FIGURE 17

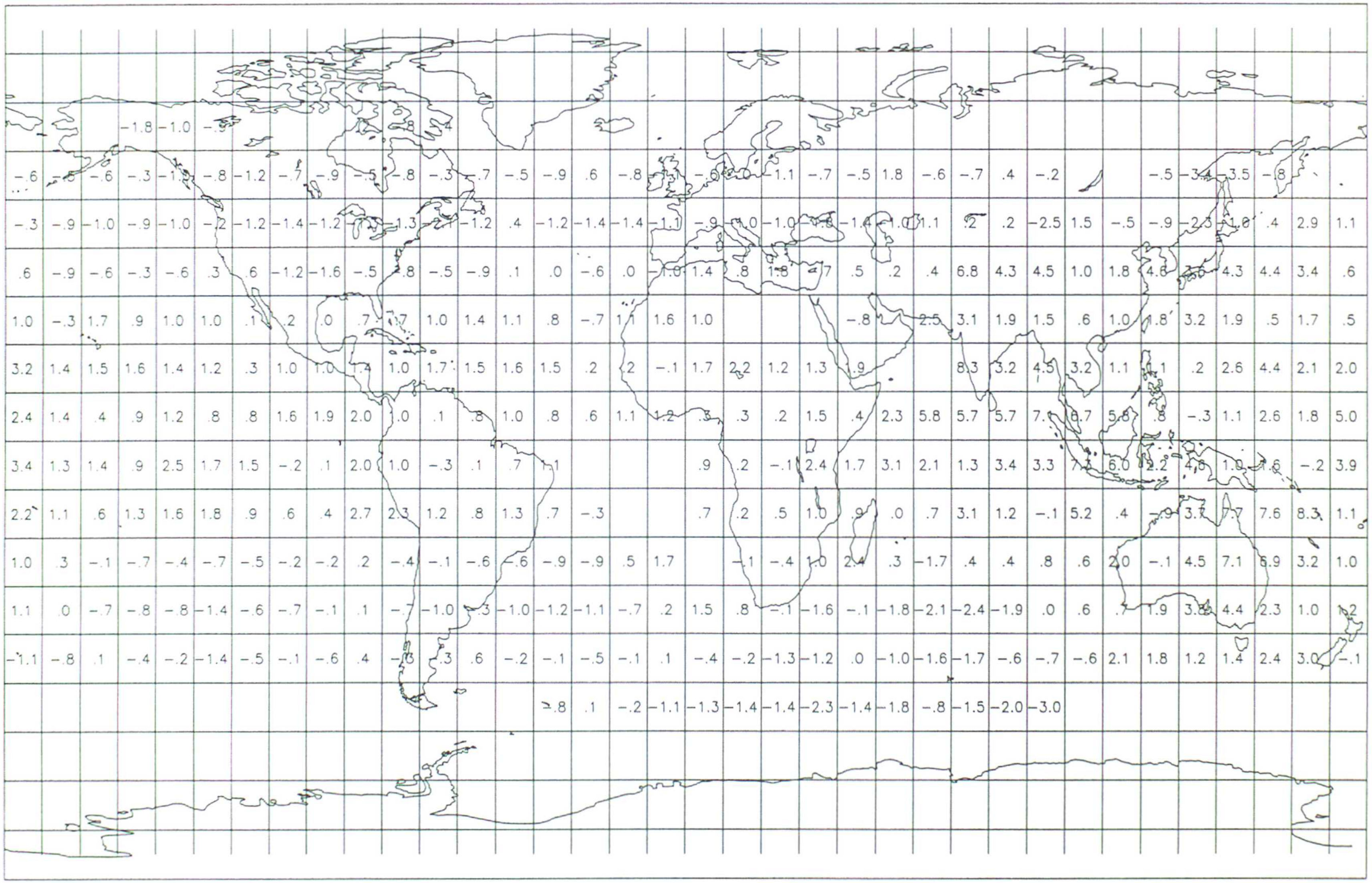
OCTOBER 1999

ALL OBSERVATIONS

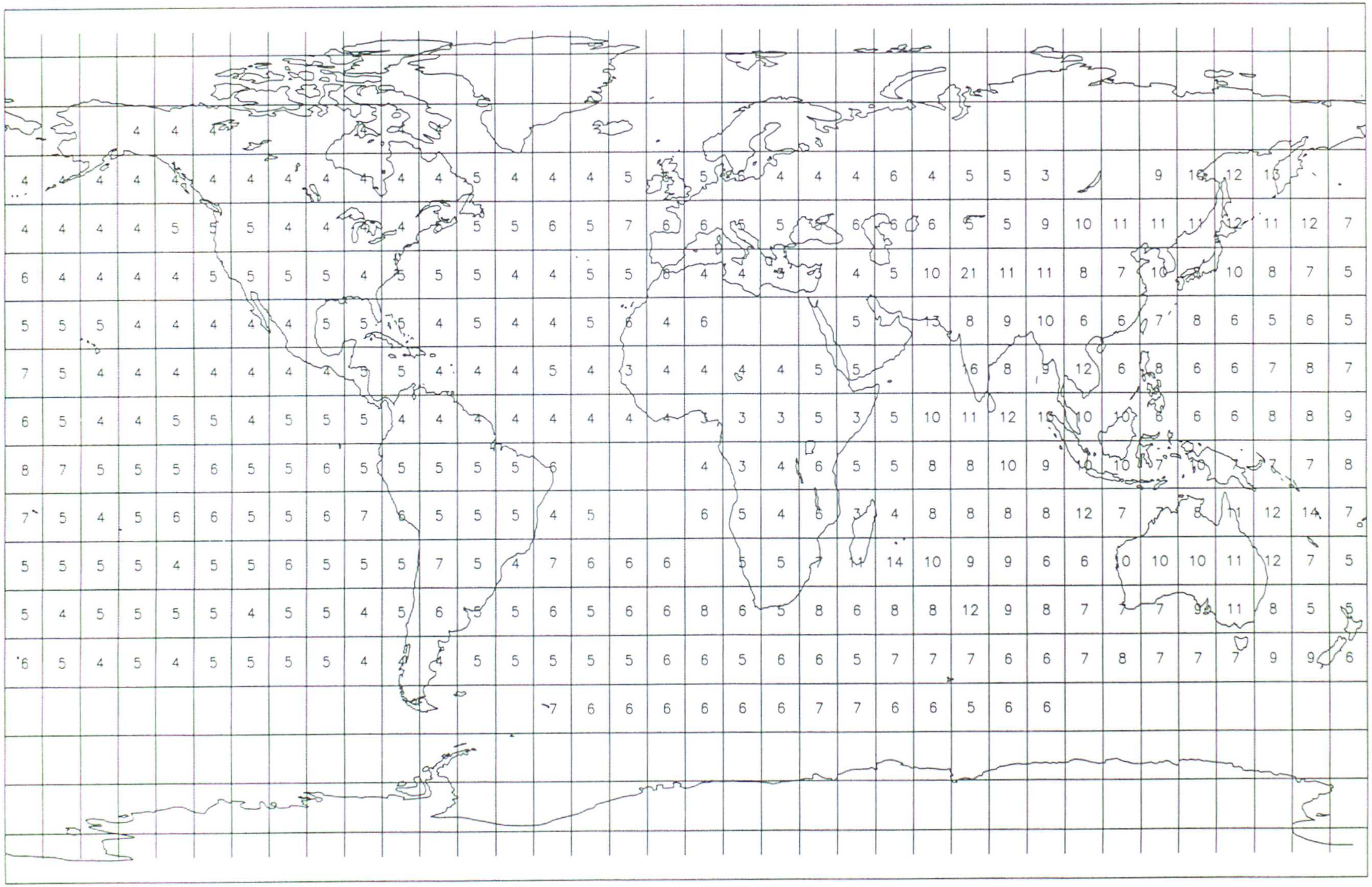
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT



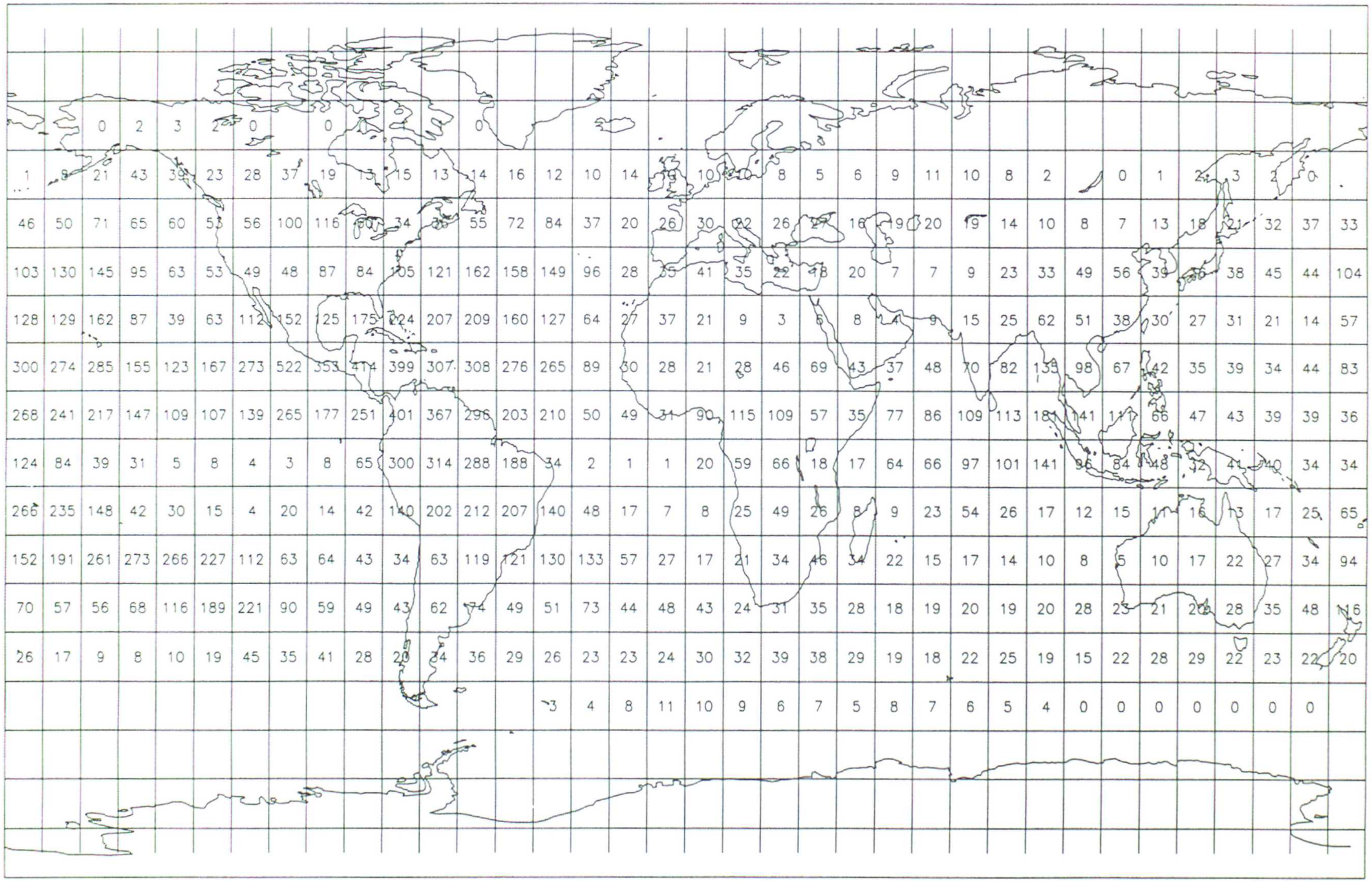
SATOBS : MEAN O–B SPEED DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 18
OCTOBER 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


-1.8 -1.0 -.9 .8 .4
-.6 -.5 -.6 -.3 -1.2 -.8 -1.2 -.7 -.9 -.5 -.8 -.3 -.7 -.5 -.9 .6 -.8 -1.1 -.6 1.0 -1.1 -.7 -.5 1.8 -.6 -.7 .4 -.2 -.5 -3.4 -3.5 -.8
-.3 -.9 -1.0 -.9 -1.0 -.2 -1.2 -1.4 -1.2 -1.1 -1.3 -2.1 -1.2 .4 -1.2 -1.4 -1.4 -1.1 -.9 -1.0 -1.0 -1.8 -1.4 -1.0 1.1 .2 .2 -2.5 1.5 -.5 -.9 -2.3 -1.0 .4 2.9 1.1
.6 -.9 -.6 -.3 -.6 .3 .6 -1.2 -1.6 -.5 .8 -.5 -.9 .1 .0 -.6 .0 -1.0 1.4 .8 1.8 .7 .5 .2 .4 6.8 4.3 4.5 1.0 1.8 4.6 3.6 4.3 4.4 3.4 .6
1.0 -.3 1.7 .9 1.0 1.0 .1 .2 .0 .7 .7 1.0 1.4 1.1 .8 -.7 1.1 1.6 1.0 -.8 2.5 3.1 1.9 1.5 .6 1.0 1.8 3.2 1.9 .5 1.7 .5
3.2 1.4 1.5 1.6 1.4 1.2 .3 1.0 1.0 1.4 1.0 1.7 1.5 1.6 1.5 .2 .2 -.1 1.7 2.2 1.2 1.3 1.9 8.3 3.2 4.5 3.2 1.1 1.1 .2 2.6 4.4 2.1 2.0
2.4 1.4 .4 .9 1.2 .8 .8 1.6 1.9 2.0 1.0 .1 .8 1.0 .8 .6 1.1 1.2 .3 .3 .2 1.5 .4 2.3 5.8 5.7 5.7 7.1 6.7 5.8 .8 -.3 1.1 2.6 1.8 5.0
3.4 1.3 1.4 .9 2.5 1.7 1.5 -.2 .1 2.0 1.0 -.3 .1 .7 1.1 .9 .2 -.1 2.4 1.7 3.1 2.1 1.3 3.4 3.3 7.3 6.0 2.2 4.8 1.0 1.6 -.2 3.9
2.2 1.1 .6 1.3 1.6 1.8 .9 .6 .4 2.7 2.3 1.2 .8 1.3 .7 -.3 .7 .2 .5 1.0 .9 .0 .7 3.1 1.2 -.1 5.2 .4 -.9 3.7 7.7 7.6 8.3 1.1
1.0 .3 -.1 -.7 -.4 -.7 -.5 -.2 -.2 .2 -.4 -.1 -.6 -.6 -.9 -.9 .5 1.7 -.1 -.4 1.0 2.4 .3 -1.7 .4 .4 .8 .6 2.0 -.1 4.5 7.1 6.9 3.2 1.0
1.1 .0 -.7 -.8 -.8 -1.4 -.6 -.7 -.1 .1 -.7 -1.0 -.3 -1.0 -1.2 -1.1 -.7 .2 1.5 .8 -.1 -1.6 -.1 -1.8 -2.1 -2.4 -1.9 .0 .6 .7 1.9 3.8 4.4 2.3 1.0 1.2
-1.1 -.8 .1 -.4 -.2 -1.4 -.5 -.1 -.6 .4 -.3 -.3 .6 -.2 -.1 -.5 -.1 .1 -.4 -.2 -1.3 -1.2 .0 -1.0 -1.6 -1.7 -.6 -.7 -.6 2.1 1.8 1.2 1.4 2.4 3.0 -.1
-.8 .1 -.2 -1.1 -1.3 -1.4 -1.4 -2.3 -1.4 -1.8 -.8 -1.5 -2.0 -3.0

SATOBS : RMS O–B VECTOR DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 19
OCTOBER 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


4 4 4
4 4 4 4 4 4 4 4 4 4 4 4 5 4 4 4 5 6 5 6 4 4 4 6 4 5 5 3 9 10 12 13
4 4 4 4 5 5 5 4 4 4 4 5 5 5 6 5 7 6 6 5 5 5 6 6 6 5 5 9 10 11 11 11 12 11 12 7
6 4 4 4 4 5 5 5 5 4 5 5 5 4 4 5 5 6 4 4 5 3 4 5 10 21 11 11 8 7 10 8 10 8 7 5
5 5 5 4 4 4 4 4 5 5 5 4 5 4 4 5 6 4 6 5 13 8 9 10 6 6 7 8 6 5 6 5
7 5 4 4 4 4 4 4 4 5 5 4 4 4 5 4 3 4 4 4 4 5 5 16 8 9 12 6 8 6 6 7 8 7
6 5 4 4 5 5 4 5 5 5 4 4 4 4 4 4 4 4 3 3 3 5 3 5 10 11 12 13 10 10 6 6 6 8 8 9
8 7 5 5 5 6 5 5 6 5 5 5 5 5 6 4 3 4 6 5 5 8 8 10 9 10 10 7 10 7 7 7 8
7 5 4 5 6 6 5 5 6 7 6 5 5 5 4 5 6 5 4 6 3 4 8 8 8 8 12 7 7 8 11 12 14 7
5 5 5 5 4 5 5 6 5 5 5 7 5 4 7 6 6 6 5 5 7 11 14 10 9 9 6 6 10 10 10 11 12 7 5
5 4 5 5 5 5 4 5 5 4 5 6 5 5 6 5 6 6 8 6 5 8 6 8 8 12 9 8 7 7 7 9 11 8 5 5
6 5 4 5 4 5 5 5 5 4 4 4 5 5 5 5 5 6 6 5 6 6 5 7 7 7 6 6 7 8 7 7 7 9 9 6
7 6 6 6 6 6 6 7 7 6 6 5 6 6

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 101 AND 400 HPA FIGURE 20
OCTOBER 1999



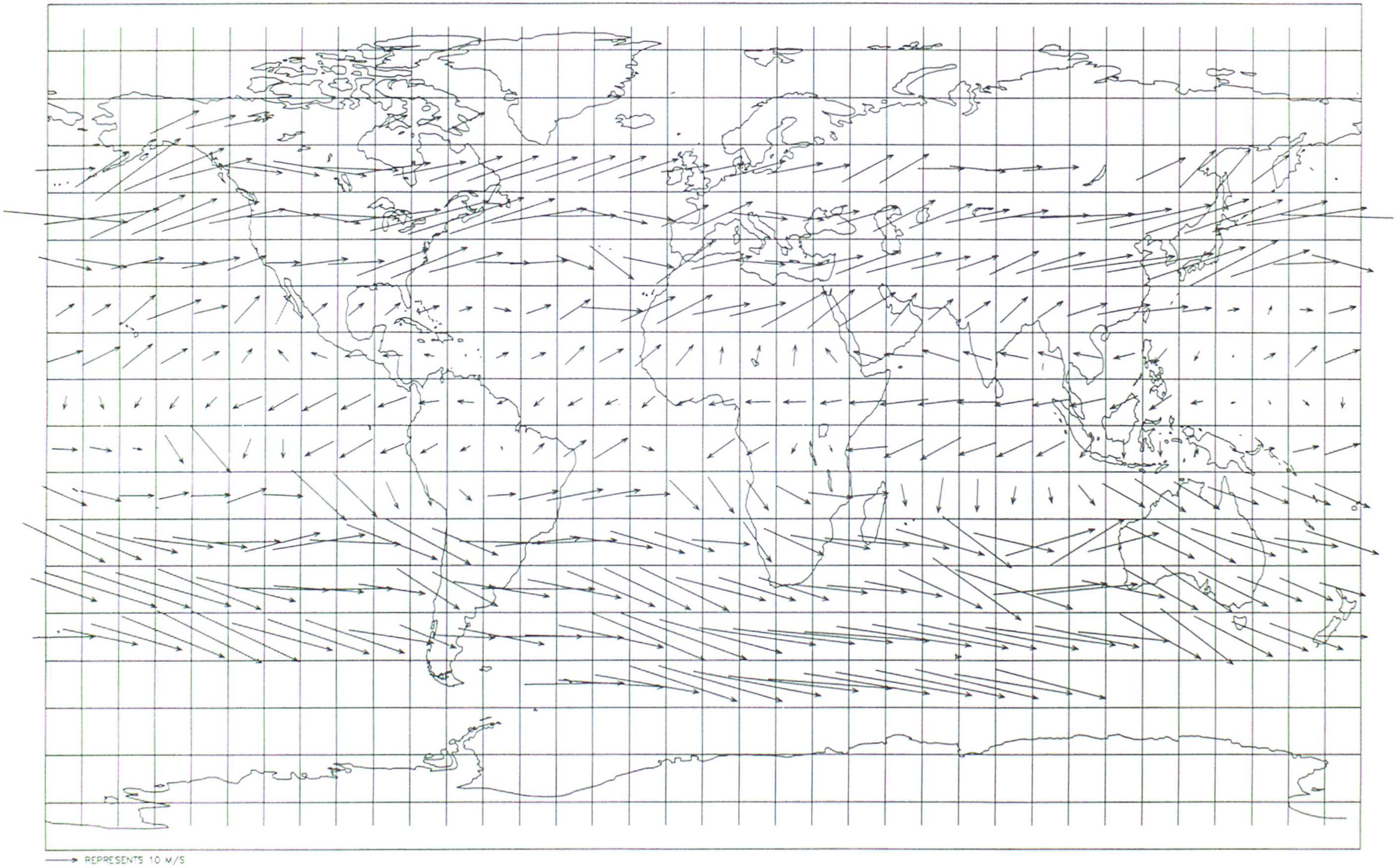
		0	2	3	2	0		0				0																							
1	8	21	43	39	23	28	37	19	13	15	13	14	16	12	10	14	19	10	10	8	5	6	9	11	10	8	2		0	1	2	3	2	0	
46	50	71	65	60	53	56	100	116	60	34	36	55	72	84	37	20	26	30	22	26	27	16	19	20	19	14	10	8	7	13	18	21	32	37	33
103	130	145	95	63	53	49	48	87	84	105	121	162	158	149	96	28	35	41	35	22	48	20	7	7	9	23	33	49	56	39	36	38	45	44	104
128	129	162	87	39	63	112	152	125	175	224	207	209	160	127	64	27	37	21	9	3	6	8	4	9	15	25	62	51	38	30	27	31	21	14	57
300	274	285	155	123	167	273	522	353	414	399	307	308	276	265	89	30	28	21	28	46	69	43	37	48	70	82	135	98	67	42	35	39	34	44	83
268	241	217	147	109	107	139	265	177	251	401	367	296	203	210	50	49	31	90	115	109	57	35	77	86	109	113	181	141	111	66	47	43	39	39	36
124	84	39	31	5	8	4	3	8	65	300	314	288	188	34	2	1	1	20	59	66	18	17	64	66	97	101	141	96	84	48	32	41	40	34	34
266	235	148	42	30	15	4	20	14	42	140	202	212	207	140	48	17	7	8	25	49	26	8	9	23	54	26	17	12	15	11	16	13	17	25	65
152	191	261	273	266	227	112	63	64	43	34	63	119	121	130	133	57	27	17	21	34	46	34	22	15	17	14	10	8	5	10	17	22	27	34	94
70	57	56	68	116	189	221	90	59	49	43	62	74	49	51	73	44	48	43	24	31	35	28	18	19	20	19	20	28	23	21	20	28	35	48	116
26	17	9	8	10	19	45	35	41	28	20	34	36	29	26	23	23	24	30	32	39	38	29	19	18	22	25	19	15	22	28	29	22	23	22	20
														3	4	8	11	10	9	6	7	5	8	7	6	5	4	0	0	0	0	0	0	0	

SATOB METEOSAT W/V VECTOR MEAN WINDS BETWEEN 101–400 HPA FIGURE 21

OCTOBER 1999

ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 10 M/S

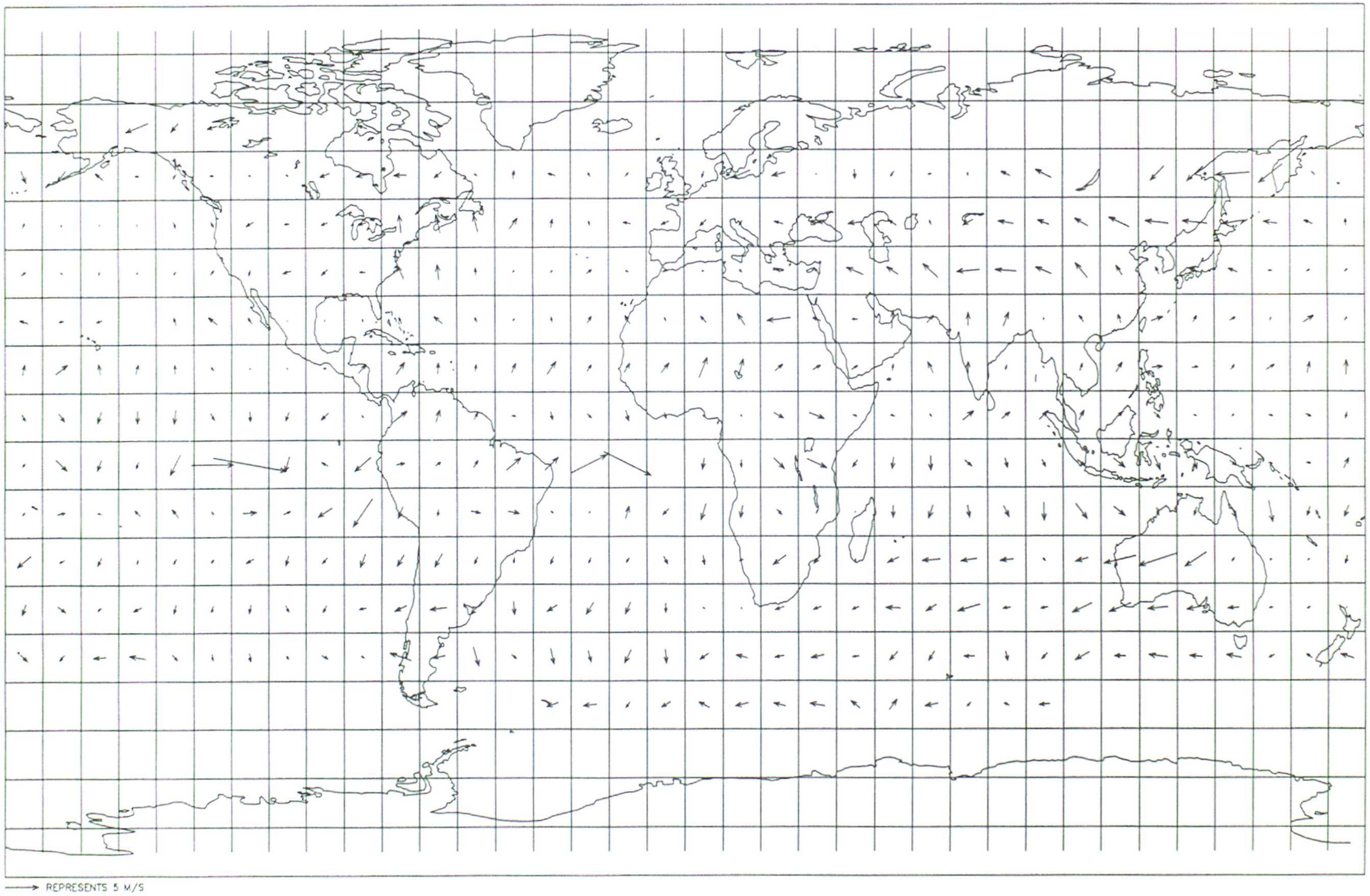
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 101–400 HPA

FIGURE 22

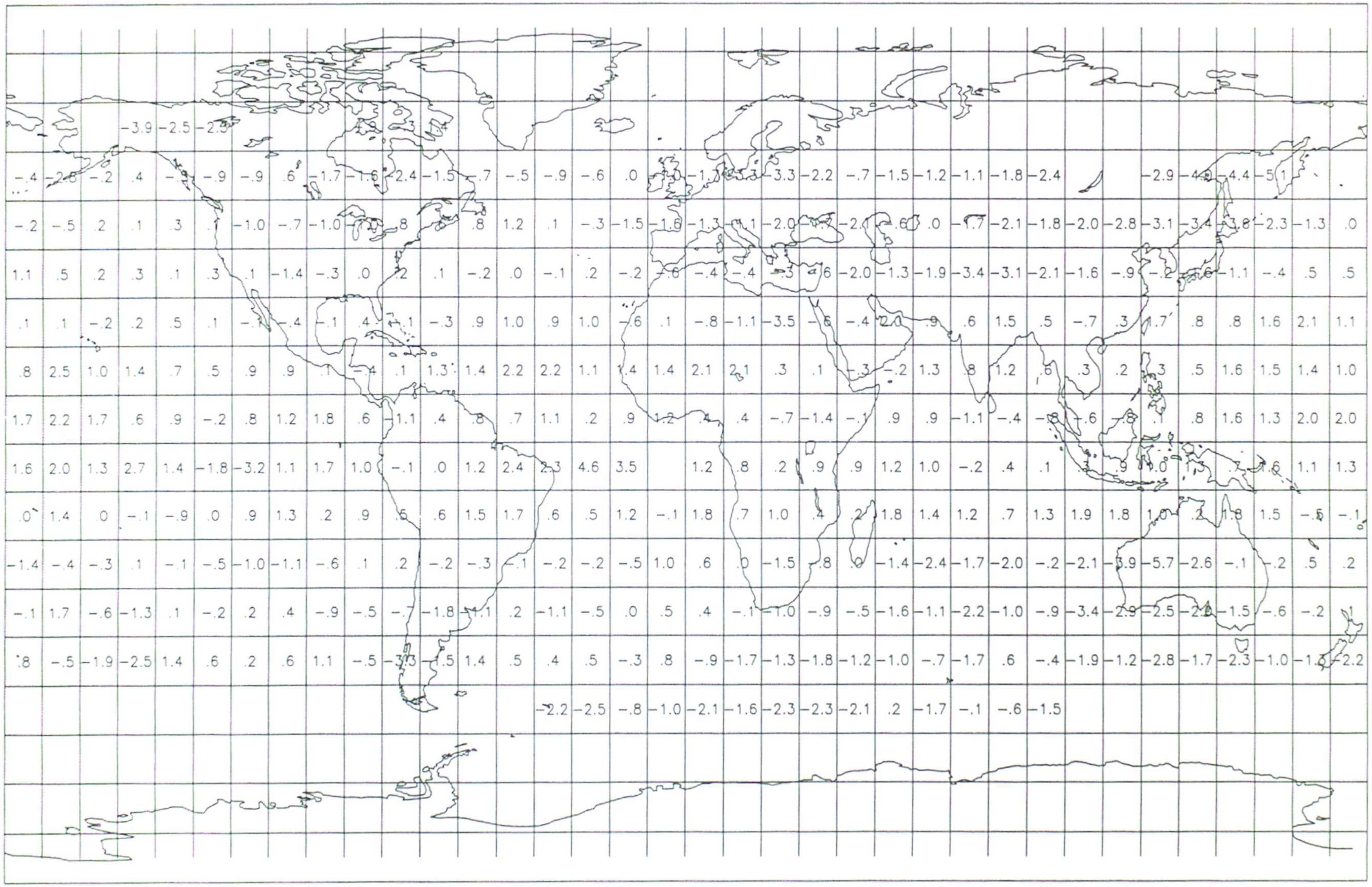
OCTOBER 1999

ALL OBSERVATIONS

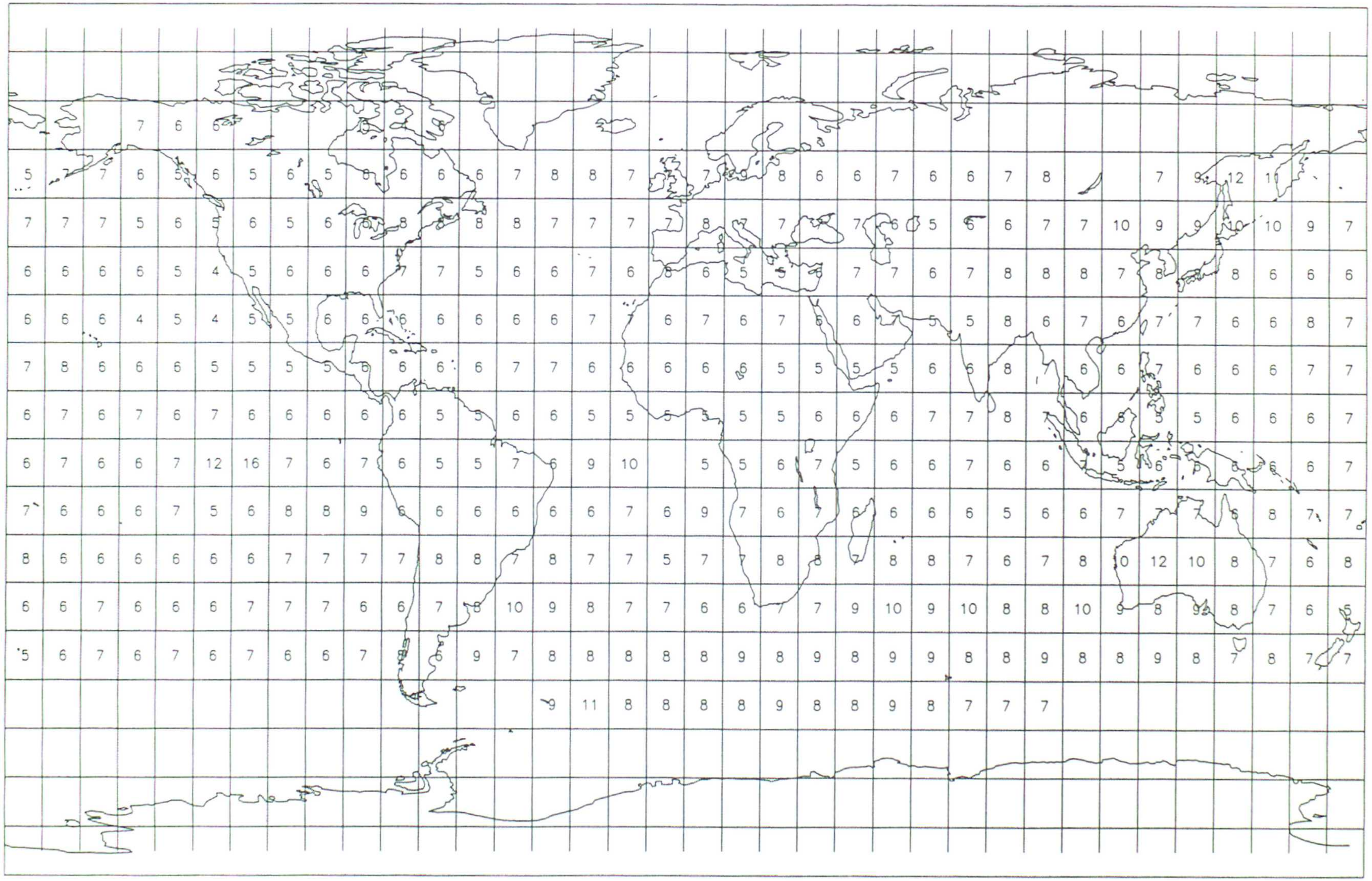
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT



SATOBS : MEAN O–B SPEED DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 23
OCTOBER 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


-3.9 -2.5 -2.3
-.4 -2.8 -.2 .4 -.3 -.9 -.9 .6 -1.7 -1.6 -2.4 -1.5 -.7 -.5 -.9 -.6 .0 -1.0 -1.7 -3.3 -3.3 -2.2 -.7 -1.5 -1.2 -1.1 -1.8 -2.4 -2.9 -4.9 -4.4 -5.1
-.2 -.5 .2 .1 .3 .1 -1.0 -.7 -1.0 -1.0 .8 .6 .8 1.2 .1 -.3 -1.5 -1.6 -1.3 -1.1 -2.0 -1.7 -2.1 -.6 .0 -1.7 -2.1 -1.8 -2.0 -2.8 -3.1 -3.4 -3.8 -2.3 -1.3 .0
1.1 .5 .2 .3 .1 .3 .1 -1.4 -.3 .0 .2 .1 -.2 .0 -.1 .2 -.2 -.6 -.4 -.4 -.3 -.6 -2.0 -1.3 -1.9 -3.4 -3.1 -2.1 -1.6 -.9 -.2 -.6 -1.1 -.4 .5 .5
.1 .1 -.2 .2 .5 .1 -.1 -.4 -.1 .4 -.1 -.3 .9 1.0 .9 1.0 -.6 .1 -.8 -1.1 -3.5 -.6 -.4 2.0 .9 .6 1.5 .5 -.7 .3 1.7 .8 .8 1.6 2.1 1.1
.8 2.5 1.0 1.4 .7 .5 .9 .9 .1 -.4 .1 1.3 1.4 2.2 2.2 1.1 1.4 1.4 2.1 2.1 .3 .1 -.3 -.2 1.3 .8 1.2 .6 .3 .2 .3 .5 1.6 1.5 1.4 1.0
1.7 2.2 1.7 .6 .9 -.2 .8 1.2 1.8 .6 -1.1 .4 .8 .7 1.1 .2 .9 1.2 .4 .4 -.7 -1.4 -.1 .9 .9 -1.1 -.4 -.8 -.6 -.8 .1 .8 1.6 1.3 2.0 2.0
1.6 2.0 1.3 2.7 1.4 -1.8 -3.2 1.1 1.7 1.0 -.1 .0 1.2 2.4 2.3 4.6 3.5 1.2 .8 .2 .9 .9 1.2 1.0 -.2 .4 .1 .3 .9 1.0 1.3 .7 1.6 1.1 1.3
.0 1.4 .0 -.1 -.9 .0 .9 1.3 .2 .9 .5 .6 1.5 1.7 .6 .5 1.2 -.1 1.8 .7 1.0 .4 .2 1.8 1.4 1.2 .7 1.3 1.9 1.8 1.0 .2 1.8 1.5 -.5 -.1
-1.4 -.4 -.3 .1 -.1 -.5 -1.0 -1.1 -.6 .1 .2 -.2 -.3 -.1 -.2 -.2 -.5 1.0 .6 .0 -1.5 .8 .0 -1.4 -2.4 -1.7 -2.0 -.2 -2.1 -3.9 -5.7 -2.6 -.1 -.2 .5 .2
-.1 1.7 -.6 -1.3 .1 -.2 .2 .4 -.9 -.5 -.7 -1.8 -1.1 .2 -1.1 -.5 .0 .5 .4 -.1 -1.0 -.9 -.5 -1.6 -1.1 -2.2 -1.0 -.9 -3.4 -2.9 -2.5 -2.0 -1.5 -.6 -.2 .1
.8 -.5 -1.9 -2.5 1.4 .6 .2 .6 1.1 -.5 -3.3 -1.5 1.4 .5 .4 .5 -.3 .8 -.9 -1.7 -1.3 -1.8 -1.2 -1.0 -.7 -1.7 .6 -.4 -1.9 -1.2 -2.8 -1.7 -2.3 -1.0 -1.3 -2.2
-2.2 -2.5 -.8 -1.0 -2.1 -1.6 -2.3 -2.3 -2.1 .2 -1.7 -.1 -.6 -1.5

SATOBS : RMS O–B VECTOR DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 24
OCTOBER 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


7 6 6
5 7 7 6 5 6 5 6 5 8 6 6 6 7 8 8 7 7 9 8 6 6 7 6 6 7 8 7 9 12 11
7 7 7 5 6 5 6 5 6 6 8 8 8 7 7 7 7 8 7 7 7 7 6 5 6 6 7 7 10 9 9 10 10 9 7
6 6 6 6 5 4 5 6 6 6 7 7 5 6 6 7 6 8 6 5 5 6 7 7 6 7 8 8 8 7 8 8 8 6 6 6
6 6 6 4 5 4 5 5 6 6 6 6 6 6 6 7 7 6 7 6 7 6 6 7 5 5 8 6 7 6 7 7 6 6 8 7
7 8 6 6 6 5 5 5 5 6 6 6 6 7 7 6 6 6 6 6 5 5 5 5 6 6 8 7 6 6 7 6 6 6 7 7
6 7 6 7 6 7 6 6 6 6 6 5 5 6 6 5 5 5 5 5 5 6 6 6 7 7 8 7 6 8 5 5 6 6 6 7
6 7 6 6 7 12 16 7 6 7 6 5 5 7 6 9 10 5 5 6 7 5 6 6 7 6 6 7 5 6 5 8 6 6 7
7 6 6 6 7 5 6 8 8 9 6 6 6 6 6 6 7 6 9 7 6 7 6 6 6 6 5 6 6 7 7 7 6 8 7 7
8 6 6 6 6 6 6 7 7 7 7 8 8 7 8 7 7 5 7 7 8 8 7 8 8 7 6 7 8 10 12 10 8 7 6 8
6 6 7 6 6 6 7 7 7 6 6 7 8 10 9 8 7 7 6 6 7 7 9 10 9 10 8 8 10 9 8 9 8 7 6 5
5 6 7 6 7 6 7 6 6 7 8 6 9 7 8 8 8 8 8 9 8 9 8 9 9 8 8 9 8 8 9 8 7 8 7 7
9 11 8 8 8 8 9 8 8 9 8 7 7 7

MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

MONTH: October 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from NOAA-15.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :All soundings.

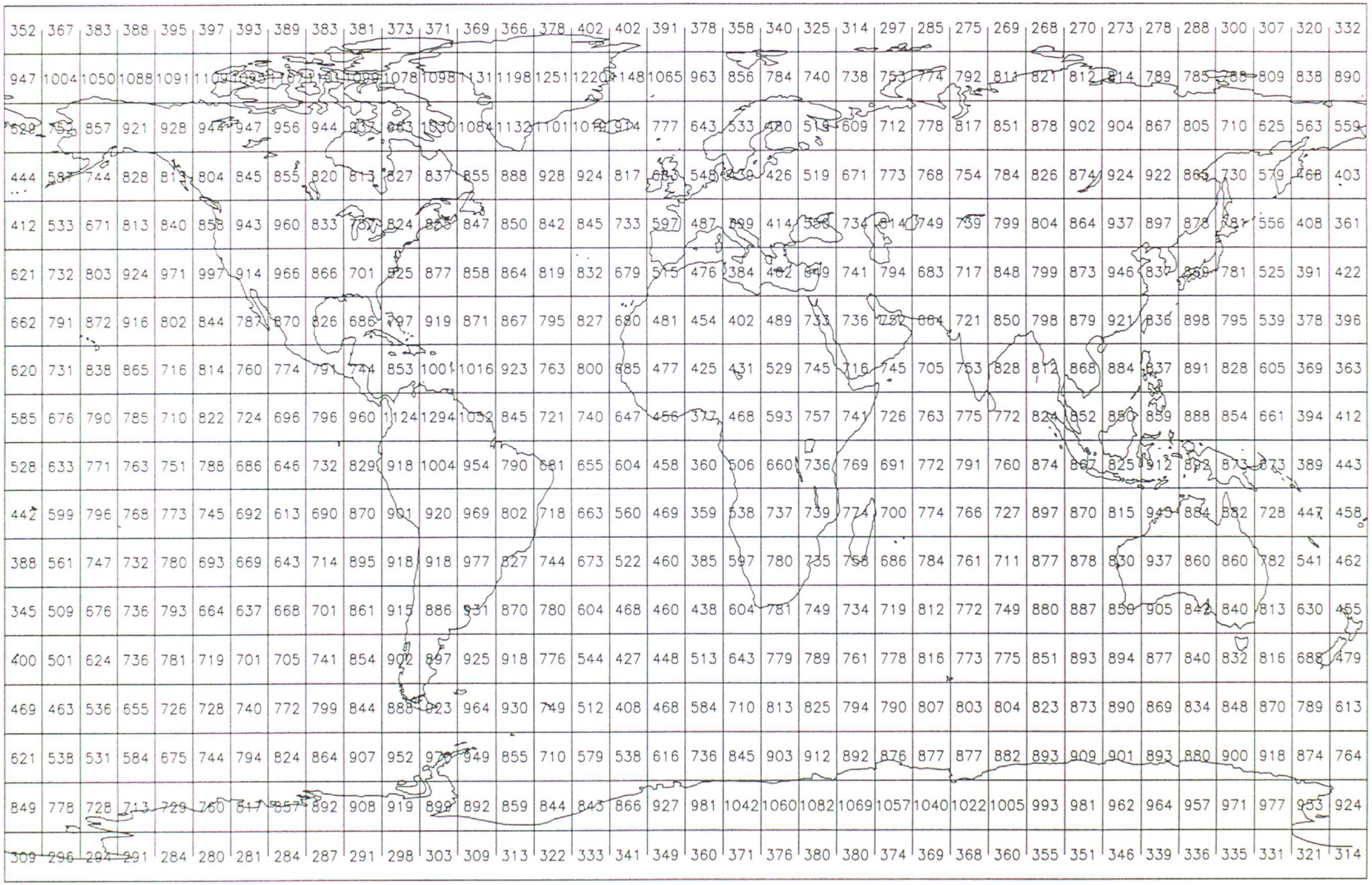
Data Extracted :Sounding channels (and approximate weighting function peaks, hPa)

- HIRS8 (Surface)
- HIRS15 (700)
- HIRS11 (500-700)
- HIRS4 (400)
- AMSUA5 (700)
- AMSUA7 (300)
- AMSUA9 (100)

:Mean and standard deviation observation-minus-background brightness temperature differences

ATOVS : MEAN DAILY NUMBER OF OBSERVATIONS
OCTOBER 1999
NOAA-15, USING ALL OBSERVATIONS

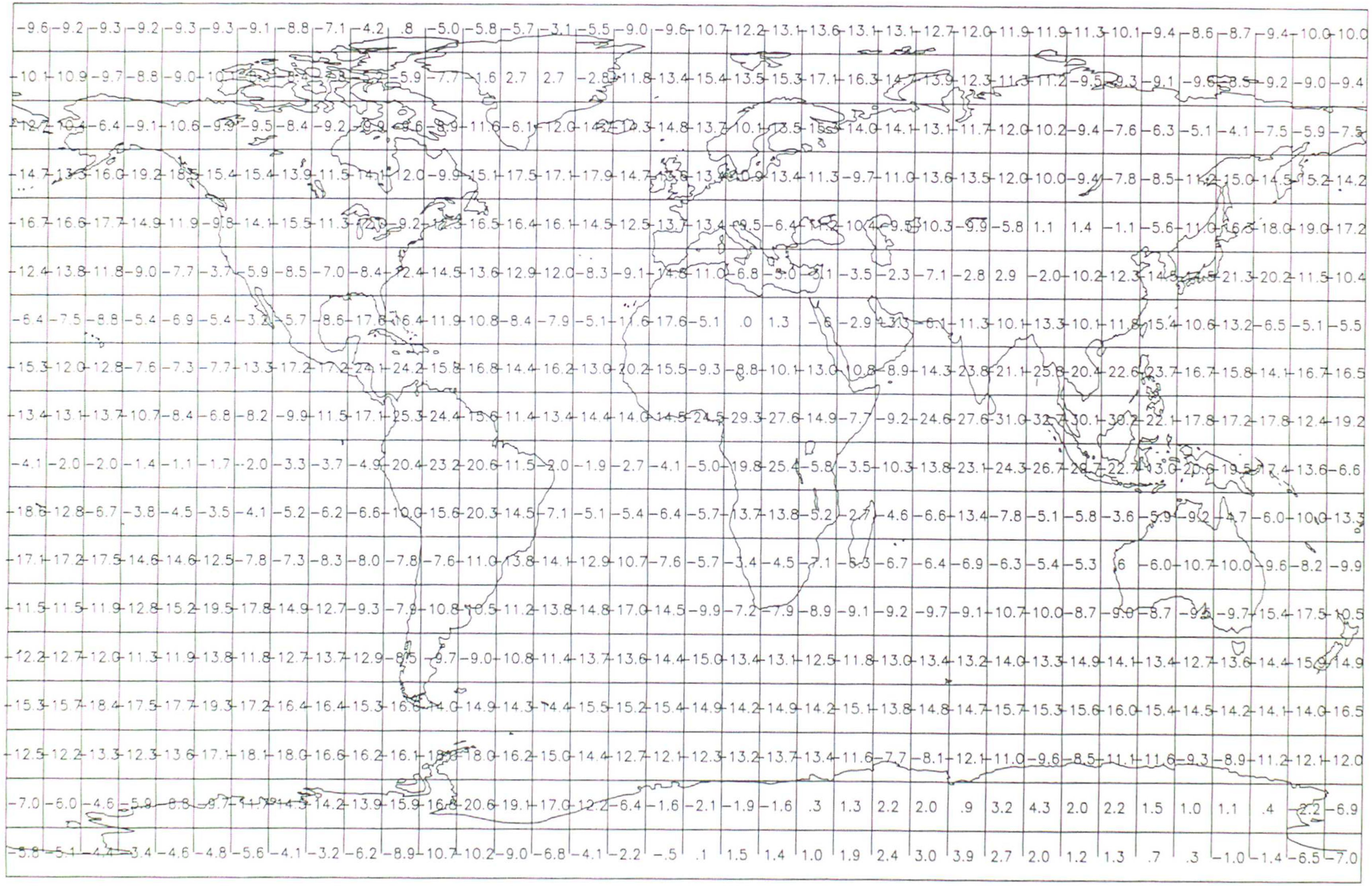
FIGURE 25



352	367	383	388	395	397	393	389	383	381	373	371	369	366	378	402	402	391	378	358	340	325	314	297	285	275	269	268	270	273	278	288	300	307	320	332
947	1004	1050	1088	1091	1109	1093	1107	1101	1099	1078	1098	1131	1198	1251	1220	1148	1065	963	856	784	740	738	753	774	792	811	821	812	814	789	785	788	809	838	890
529	752	857	921	928	944	947	956	944	937	863	1030	1084	1132	1101	1019	914	777	643	533	480	519	609	712	778	817	851	878	902	904	867	805	710	625	563	559
444	587	744	828	813	804	845	855	820	813	827	837	855	888	928	924	817	683	548	439	426	519	671	773	768	754	784	826	874	924	922	865	730	579	468	403
412	533	671	813	840	858	943	960	833	757	824	855	847	850	842	845	733	597	487	399	414	556	734	814	749	739	799	804	864	937	897	878	781	556	408	361
621	732	803	924	971	997	914	966	866	701	825	877	858	864	819	832	679	515	476	384	402	649	741	794	683	717	848	799	873	946	837	859	781	525	391	422
662	791	872	916	802	844	787	870	826	686	797	919	871	867	795	827	680	481	454	402	489	733	736	752	664	721	850	798	879	921	836	898	795	539	378	396
620	731	838	865	716	814	760	774	791	744	853	1001	1016	923	763	800	685	477	425	431	529	745	716	745	705	753	828	812	868	884	837	891	828	605	369	363
585	676	790	785	710	822	724	696	796	960	1124	1294	1052	845	721	740	647	456	377	468	593	757	741	726	763	775	772	824	852	850	859	888	854	661	394	412
528	633	771	763	751	788	686	646	732	829	918	1004	954	790	681	655	604	458	360	506	660	736	769	691	772	791	760	874	867	825	912	892	873	873	389	443
442	599	796	768	773	745	692	613	690	870	901	920	969	802	718	663	560	469	359	538	737	739	774	700	774	766	727	897	870	815	945	884	882	728	447	458
388	561	747	732	780	693	669	643	714	895	918	918	977	827	744	673	522	460	385	597	780	735	758	686	784	761	711	877	878	830	937	860	860	782	541	462
345	509	676	736	793	664	637	668	701	861	915	886	931	870	780	604	468	460	438	604	781	749	734	719	812	772	749	880	887	850	905	842	840	813	630	455
400	501	624	736	781	719	701	705	741	854	902	897	925	918	776	544	427	448	513	643	779	789	761	778	816	773	775	851	893	894	877	840	832	816	688	479
469	463	536	655	726	728	740	772	799	844	888	923	964	930	749	512	408	468	584	710	813	825	794	790	807	803	804	823	873	890	869	834	848	870	789	613
621	538	531	584	675	744	794	824	864	907	952	970	949	855	710	579	538	616	736	845	903	912	892	876	877	877	882	893	909	901	893	880	900	918	874	764
849	778	728	713	729	760	817	857	892	908	919	899	892	859	844	843	866	927	981	1042	1060	1082	1069	1057	1040	1022	1005	993	981	962	964	957	971	977	953	924
309	296	294	291	284	280	281	284	287	291	298	303	309	313	322	333	341	349	360	371	376	380	380	374	369	368	360	355	351	346	339	336	335	331	321	314

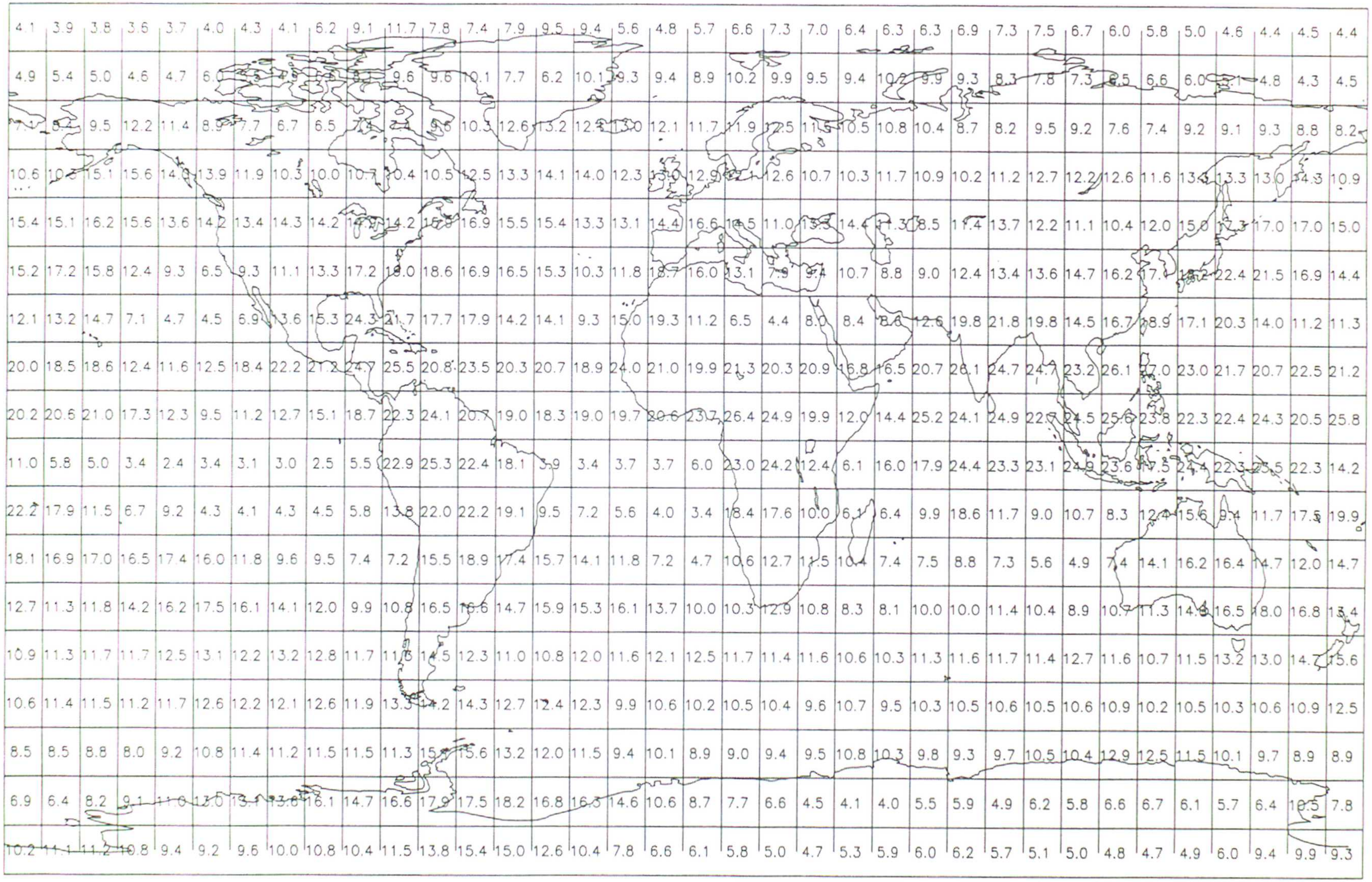
ATOVS : MEAN O–B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)
OCTOBER 1999 : HIRS8 channel (Surface)
NOAA–15, USING ALL OBSERVATIONS

FIGURE 26


-9.6 -9.2 -9.3 -9.2 -9.3 -9.3 -9.1 -8.8 -7.1 -4.2 .8 -5.0 -5.8 -5.7 -3.1 -5.5 -9.0 -9.6 -10.7 -12.2 -13.1 -13.6 -13.1 -13.1 -12.7 -12.0 -11.9 -11.9 -11.3 -10.1 -9.4 -8.6 -8.7 -9.4 -10.0 -10.0
-10.1 -10.9 -9.7 -8.8 -9.0 [illegible] [illegible] -8.4 [illegible] [illegible] -5.9 -7.7 1.6 2.7 2.7 -2.8 -11.8 -13.4 -15.4 -13.5 -15.3 -17.1 -16.3 -14.7 -13.9 -12.3 -11.3 -11.2 -9.5 -9.3 -9.1 -9.6 -8.5 -9.2 -9.0 -9.4
-12.7 -10.4 -6.4 -9.1 -10.6 -9.9 -9.5 -8.4 -9.2 -9.9 -9.6 -8.9 -11.6 -6.1 -12.0 -14.2 -14.3 -14.8 -13.7 -10.1 -13.5 -15.5 -14.0 -14.1 -13.1 -11.7 -12.0 -10.2 -9.4 -7.6 -6.3 -5.1 -4.1 -7.5 -5.9 -7.5
-14.7 -13.3 -16.0 -19.2 -18.5 -15.4 -15.4 -13.9 -11.5 -14.1 -12.0 -9.9 -15.1 -17.5 -17.1 -17.9 -14.7 -13.6 [illegible] -10.9 -13.4 -11.3 -9.7 -11.0 -13.6 -13.5 -12.0 -10.0 -9.4 -7.8 -8.5 -11.2 -15.0 -14.5 -15.2 -14.2
-16.7 -16.6 -17.7 -14.9 -11.9 -9.8 -14.1 -15.5 -11.3 -12.0 -9.2 -12.3 -16.5 -16.4 -16.1 -14.5 -12.5 -13.7 -13.4 -9.5 -6.4 -11.2 -10.4 -9.5 -10.3 -9.9 -5.8 1.1 1.4 -1.1 -5.6 -11.0 -16.3 -18.0 -19.0 -17.2
-12.4 -13.8 -11.8 -9.0 -7.7 -3.7 -5.9 -8.5 -7.0 -8.4 -12.4 -14.5 -13.6 -12.9 -12.0 -8.3 -9.1 -14.8 -11.0 -6.8 -5.0 -3.1 -3.5 -2.3 -7.1 -2.8 2.9 -2.0 -10.2 -12.3 -14.5 -17.5 -21.3 -20.2 -11.5 -10.4
-6.4 -7.5 -8.8 -5.4 -6.9 -5.4 -3.2 -5.7 -8.6 -17.6 -16.4 -11.9 -10.8 -8.4 -7.9 -5.1 -11.6 -17.6 -5.1 .0 1.3 -.6 -2.9 -3.3 -6.1 -11.3 -10.1 -13.3 -10.1 -11.8 -15.4 -10.6 -13.2 -6.5 -5.1 -5.5
-15.3 -12.0 -12.8 -7.6 -7.3 -7.7 -13.3 -17.2 -17.2 -24.1 -24.2 -15.8 -16.8 -14.4 -16.2 -13.0 -20.2 -15.5 -9.3 -8.8 -10.1 -13.0 -10.8 -8.9 -14.3 -23.8 -21.1 -25.8 -20.4 -22.6 -23.7 -16.7 -15.8 -14.1 -16.7 -16.5
-13.4 -13.1 -13.7 -10.7 -8.4 -6.8 -8.2 -9.9 -11.5 -17.1 -25.3 -24.4 -15.6 -11.4 -13.4 -14.4 -14.0 -14.5 -24.5 -29.3 -27.6 -14.9 -7.7 -9.2 -24.6 -27.6 -31.0 -32.7 -30.1 -30.2 -22.1 -17.8 -17.2 -17.8 -12.4 -19.2
-4.1 -2.0 -2.0 -1.4 -1.1 -1.7 -2.0 -3.3 -3.7 -4.9 -20.4 -23.2 -20.6 -11.5 -2.0 -1.9 -2.7 -4.1 -5.0 -19.8 -25.4 -5.8 -3.5 -10.3 -13.8 -23.1 -24.3 -26.7 -28.7 -22.7 -13.0 -20.6 -19.5 -17.4 -13.6 -6.6
-18.6 -12.8 -6.7 -3.8 -4.5 -3.5 -4.1 -5.2 -6.2 -6.6 -10.0 -15.6 -20.3 -14.5 -7.1 -5.1 -5.4 -6.4 -5.7 -13.7 -13.8 -5.2 -2.7 -4.6 -6.6 -13.4 -7.8 -5.1 -5.8 -3.6 -5.9 -9.2 -4.7 -6.0 -10.0 -13.3
-17.1 -17.2 -17.5 -14.6 -14.6 -12.5 -7.8 -7.3 -8.3 -8.0 -7.8 -7.6 -11.0 -13.8 -14.1 -12.9 -10.7 -7.6 -5.7 -3.4 -4.5 -7.1 -6.3 -6.7 -6.4 -6.9 -6.3 -5.4 -5.3 .6 -6.0 -10.7 -10.0 -9.6 -8.2 -9.9
-11.5 -11.5 -11.9 -12.8 -15.2 -19.5 -17.8 -14.9 -12.7 -9.3 -7.9 -10.8 -10.5 -11.2 -13.8 -14.8 -17.0 -14.5 -9.9 -7.2 -7.9 -8.9 -9.1 -9.2 -9.7 -9.1 -10.7 -10.0 -8.7 -9.0 -8.7 -9.5 -9.7 -15.4 -17.5 -10.5
-12.2 -12.7 -12.0 -11.3 -11.9 -13.8 -11.8 -12.7 -13.7 -12.9 -8.5 -9.7 -9.0 -10.8 -11.4 -13.7 -13.6 -14.4 -15.0 -13.4 -13.1 -12.5 -11.8 -13.0 -13.4 -13.2 -14.0 -13.3 -14.9 -14.1 -13.4 -12.7 -13.6 -14.4 -15.9 -14.9
-15.3 -15.7 -18.4 -17.5 -17.7 -19.3 -17.2 -16.4 -16.4 -15.3 -16.6 -14.0 -14.9 -14.3 -14.4 -15.5 -15.2 -15.4 -14.9 -14.2 -14.9 -14.2 -15.1 -13.8 -14.8 -14.7 -15.7 -15.3 -15.6 -16.0 -15.4 -14.5 -14.2 -14.1 -14.0 -16.5
-12.5 -12.2 -13.3 -12.3 -13.6 -17.1 -18.1 -18.0 -16.6 -16.2 -16.1 [illegible] -18.0 -16.2 -15.0 -14.4 -12.7 -12.1 -12.3 -13.2 -13.7 -13.4 -11.6 -7.7 -8.1 -12.1 -11.0 -9.6 -8.5 -11.1 -11.6 -9.3 -8.9 -11.2 -12.1 -12.0
-7.0 -6.0 -4.6 -5.9 -8.8 -9.7 -11.7 -14.5 -14.2 -13.9 -15.9 -16.8 -20.6 -19.1 -17.0 -12.2 -6.4 -1.6 -2.1 -1.9 -1.6 .3 1.3 2.2 2.0 .9 3.2 4.3 2.0 2.2 1.5 1.0 1.1 .4 -2.2 -6.9
-5.8 -5.1 -4.4 -3.4 -4.6 -4.8 -5.6 -4.1 -3.2 -6.2 -8.9 -10.7 -10.2 -9.0 -6.8 -4.1 -2.2 -.5 .1 1.5 1.4 1.0 1.9 2.4 3.0 3.9 2.7 2.0 1.2 1.3 .7 .3 -1.0 -1.4 -6.5 -7.0

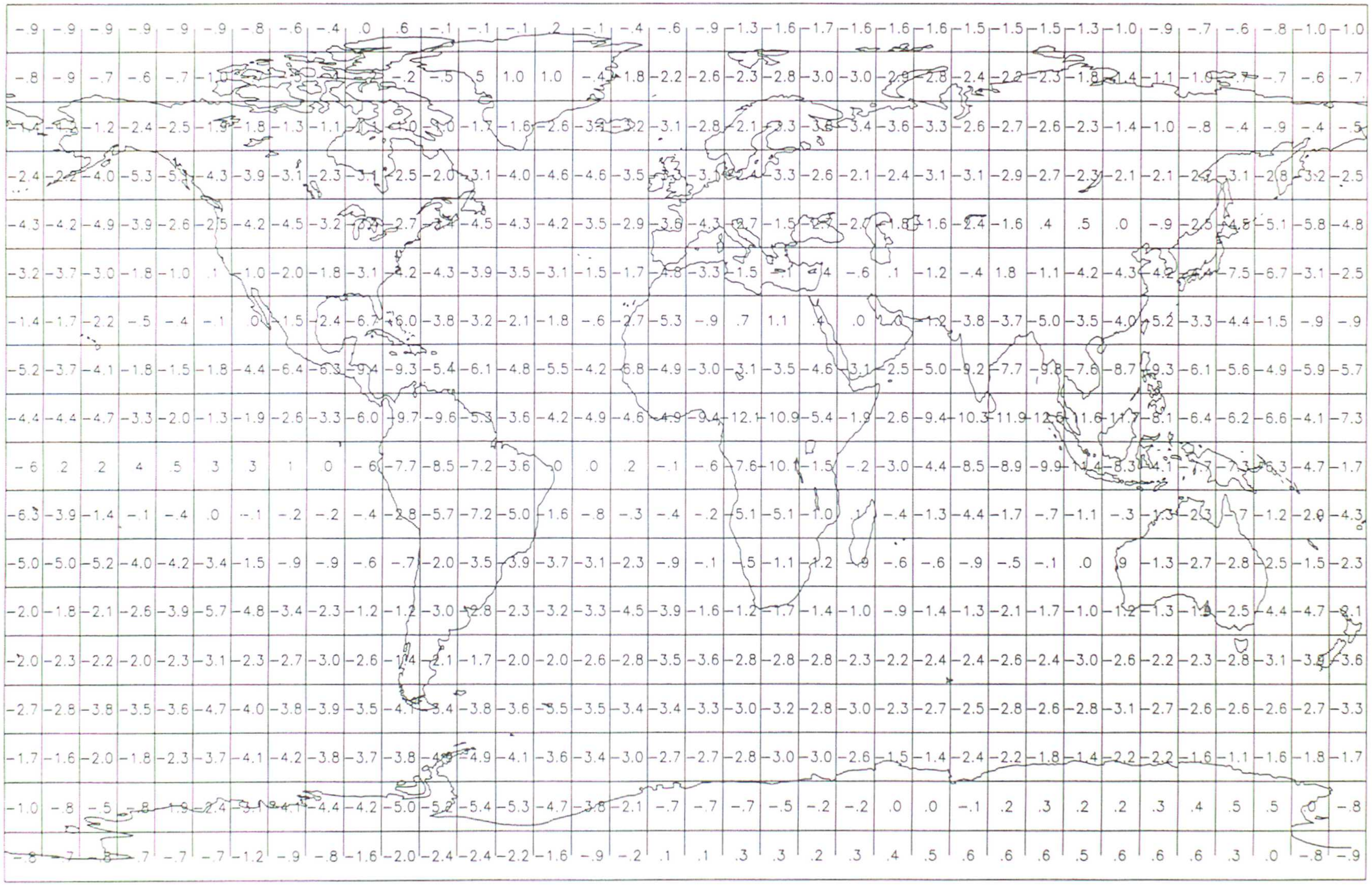
ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
OCTOBER 1999 : HIRS8 channel (Surface)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 27

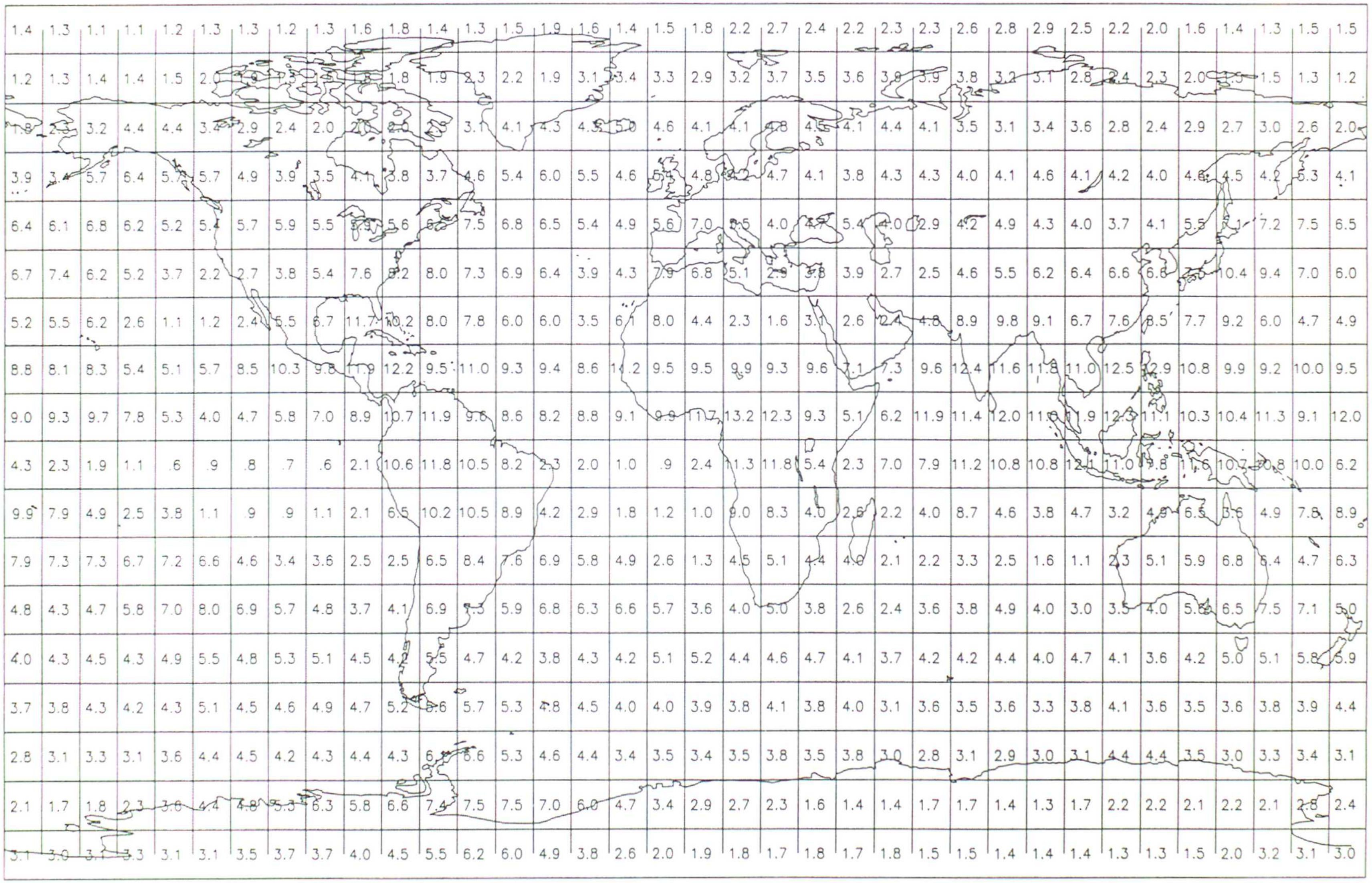


4.1	3.9	3.8	3.6	3.7	4.0	4.3	4.1	6.2	9.1	11.7	7.8	7.4	7.9	9.5	9.4	5.6	4.8	5.7	6.6	7.3	7.0	6.4	6.3	6.3	6.9	7.3	7.5	6.7	6.0	5.8	5.0	4.6	4.4	4.5	4.4
4.9	5.4	5.0	4.6	4.7	6.0	[illegible]	4.9	[illegible]	[illegible]	9.6	9.6	10.1	7.7	6.2	10.1	9.3	9.4	8.9	10.2	9.9	9.5	9.4	10.2	9.9	9.3	8.3	7.8	7.3	6.5	6.6	6.0	5.1	4.8	4.3	4.5
7.1	8.4	9.5	12.2	11.4	8.9	7.7	6.7	6.5	7.4	7.4	9.6	10.3	12.6	13.2	12.3	13.0	12.1	11.7	11.9	12.5	11.5	10.5	10.8	10.4	8.7	8.2	9.5	9.2	7.6	7.4	9.2	9.1	9.3	8.8	8.2
10.6	10.3	15.1	15.6	14.0	13.9	11.9	10.3	10.0	10.7	10.4	10.5	12.5	13.3	14.1	14.0	12.3	13.0	12.9	12.1	12.6	10.7	10.3	11.7	10.9	10.2	11.2	12.7	12.2	12.6	11.6	13.3	13.3	13.0	14.3	10.9
15.4	15.1	16.2	15.6	13.6	14.2	13.4	14.3	14.2	14.2	14.2	15.8	16.9	15.5	15.4	13.3	13.1	14.4	16.6	14.5	11.0	13.3	14.4	11.3	8.5	11.4	13.7	12.2	11.1	10.4	12.0	15.0	17.3	17.0	17.0	15.0
15.2	17.2	15.8	12.4	9.3	6.5	9.3	11.1	13.3	17.2	18.0	18.6	16.9	16.5	15.3	10.3	11.8	18.7	16.0	13.1	7.9	9.4	10.7	8.8	9.0	12.4	13.4	13.6	14.7	16.2	17.4	18.2	22.4	21.5	16.9	14.4
12.1	13.2	14.7	7.1	4.7	4.5	6.9	13.6	15.3	24.3	21.7	17.7	17.9	14.2	14.1	9.3	15.0	19.3	11.2	6.5	4.4	8.0	8.4	8.6	12.6	19.8	21.8	19.8	14.5	16.7	18.9	17.1	20.3	14.0	11.2	11.3
20.0	18.5	18.6	12.4	11.6	12.5	18.4	22.2	21.2	24.7	25.5	20.8	23.5	20.3	20.7	18.9	24.0	21.0	19.9	21.3	20.3	20.9	16.8	16.5	20.7	26.1	24.7	24.7	23.2	26.1	27.0	23.0	21.7	20.7	22.5	21.2
20.2	20.6	21.0	17.3	12.3	9.5	11.2	12.7	15.1	18.7	22.3	24.1	20.7	19.0	18.3	19.0	19.7	20.6	23.7	26.4	24.9	19.9	12.0	14.4	25.2	24.1	24.9	22.7	24.5	25.6	23.8	22.3	22.4	24.3	20.5	25.8
11.0	5.8	5.0	3.4	2.4	3.4	3.1	3.0	2.5	5.5	22.9	25.3	22.4	18.1	3.9	3.4	3.7	3.7	6.0	23.0	24.2	12.4	6.1	16.0	17.9	24.4	23.3	23.1	24.9	23.6	17.5	24.4	22.3	25.5	22.3	14.2
22.2	17.9	11.5	6.7	9.2	4.3	4.1	4.3	4.5	5.8	13.8	22.0	22.2	19.1	9.5	7.2	5.6	4.0	3.4	18.4	17.6	10.0	6.1	6.4	9.9	18.6	11.7	9.0	10.7	8.3	12.4	15.6	9.4	11.7	17.5	19.9
18.1	16.9	17.0	16.5	17.4	16.0	11.8	9.6	9.5	7.4	7.2	15.5	18.9	17.4	15.7	14.1	11.8	7.2	4.7	10.6	12.7	11.5	10.4	7.4	7.5	8.8	7.3	5.6	4.9	7.4	14.1	16.2	16.4	14.7	12.0	14.7
12.7	11.3	11.8	14.2	16.2	17.5	16.1	14.1	12.0	9.9	10.8	16.5	16.6	14.7	15.9	15.3	16.1	13.7	10.0	10.3	12.9	10.8	8.3	8.1	10.0	10.0	11.4	10.4	8.9	10.7	11.3	14.8	16.5	18.0	16.8	13.4
10.9	11.3	11.7	11.7	12.5	13.1	12.2	13.2	12.8	11.7	11.6	14.5	12.3	11.0	10.8	12.0	11.6	12.1	12.5	11.7	11.4	11.6	10.6	10.3	11.3	11.6	11.7	11.4	12.7	11.6	10.7	11.5	13.2	13.0	14.7	15.6
10.6	11.4	11.5	11.2	11.7	12.6	12.2	12.1	12.6	11.9	13.3	14.2	14.3	12.7	12.4	12.3	9.9	10.6	10.2	10.5	10.4	9.6	10.7	9.5	10.3	10.5	10.6	10.5	10.6	10.9	10.2	10.5	10.3	10.6	10.9	12.5
8.5	8.5	8.8	8.0	9.2	10.8	11.4	11.2	11.5	11.5	11.3	[illegible]	15.6	13.2	12.0	11.5	9.4	10.1	8.9	9.0	9.4	9.5	10.8	10.3	9.8	9.3	9.7	10.5	10.4	12.9	12.5	11.5	10.1	9.7	8.9	8.9
6.9	6.4	8.2	9.1	11.0	13.0	13.1	13.6	16.1	14.7	16.6	17.9	17.5	18.2	16.8	16.3	14.6	10.6	8.7	7.7	6.6	4.5	4.1	4.0	5.5	5.9	4.9	6.2	5.8	6.6	6.7	6.1	5.7	6.4	10.5	7.8
10.2	11.1	11.2	10.8	9.4	9.2	9.6	10.0	10.8	10.4	11.5	13.8	15.4	15.0	12.6	10.4	7.8	6.6	6.1	5.8	5.0	4.7	5.3	5.9	6.0	6.2	5.7	5.1	5.0	4.8	4.7	4.9	6.0	9.4	9.9	9.3

ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C) FIGURE 28
OCTOBER 1999 : HIRS15 Channel (700 hPa)
NOAA-15, USING ALL OBSERVATIONS


-.9 -.9 -.9 -.9 -.9 -.9 -.8 -.6 -.4 .0 .6 -.1 -.1 -.1 .2 -.1 -.4 -.6 -.9 -1.3 -1.6 -1.7 -1.6 -1.6 -1.6 -1.5 -1.5 -1.5 -1.3 -1.0 -.9 -.7 -.6 -.8 -1.0 -1.0
-.8 -.9 -.7 -.6 -.7 -1.0 -.7 -.5 -.1 -.7 -.2 -.5 .5 1.0 1.0 -.4 -1.8 -2.2 -2.6 -2.3 -2.8 -3.0 -3.0 -2.9 -2.8 -2.4 -2.2 -2.3 -1.8 -1.4 -1.1 -1.0 -.7 -.7 -.6 -.7
-1.4 -1.2 -1.2 -2.4 -2.5 -1.9 -1.8 -1.3 -1.1 -1.1 -1.0 -1.0 -1.7 -1.6 -2.6 [illegible] -3.2 -3.1 -2.8 -2.1 -3.3 -3.8 -3.4 -3.6 -3.3 -2.6 -2.7 -2.6 -2.3 -1.4 -1.0 -.8 -.4 -.9 -.4 -.5
-2.4 -2.2 -4.0 -5.3 [illegible] -4.3 -3.9 -3.1 -2.3 -3.1 -2.5 -2.0 -3.1 -4.0 -4.6 -4.6 -3.5 -3.3 -3.1 -2.4 -3.3 -2.6 -2.1 -2.4 -3.1 -3.1 -2.9 -2.7 -2.3 -2.1 -2.1 [illegible] -3.1 -2.8 -3.2 -2.5
-4.3 -4.2 -4.9 -3.9 -2.6 -2.5 -4.2 -4.5 -3.2 [illegible] -2.7 -3.4 -4.5 -4.3 -4.2 -3.5 -2.9 -3.6 -4.3 -2.7 -1.5 -2.7 -2.0 -1.8 -1.6 -2.4 -1.6 .4 .5 .0 -.9 -2.5 -4.8 -5.1 -5.8 -4.8
-3.2 -3.7 -3.0 -1.8 -1.0 .1 -1.0 -2.0 -1.8 -3.1 -4.2 -4.3 -3.9 -3.5 -3.1 -1.5 -1.7 -4.8 -3.3 -1.5 -.1 .4 -.6 .1 -1.2 -.4 1.8 -1.1 -4.2 -4.3 -4.2 -4.4 -7.5 -6.7 -3.1 -2.5
-1.4 -1.7 -2.2 -.5 -.4 -.1 .0 -1.5 -2.4 -6.7 -6.0 -3.8 -3.2 -2.1 -1.8 -.6 -2.7 -5.3 -.9 .7 1.1 .4 .0 -1.0 -1.2 -3.8 -3.7 -5.0 -3.5 -4.0 -5.2 -3.3 -4.4 -1.5 -.9 -.9
-5.2 -3.7 -4.1 -1.8 -1.5 -1.8 -4.4 -6.4 -6.3 -9.4 -9.3 -5.4 -6.1 -4.8 -5.5 -4.2 -6.8 -4.9 -3.0 -3.1 -3.5 -4.6 -3.1 -2.5 -5.0 -9.2 -7.7 -9.8 -7.6 -8.7 -9.3 -6.1 -5.6 -4.9 -5.9 -5.7
-4.4 -4.4 -4.7 -3.3 -2.0 -1.3 -1.9 -2.6 -3.3 -6.0 -9.7 -9.6 -5.3 -3.6 -4.2 -4.9 -4.6 -4.9 -9.4 -12.1 -10.9 -5.4 -1.9 -2.6 -9.4 -10.3 -11.9 -12.6 -11.6 -11.7 -8.1 -6.4 -6.2 -6.6 -4.1 -7.3
-.6 .2 .2 .4 .5 .3 .3 .1 .0 -.6 -7.7 -8.5 -7.2 -3.6 .0 .0 .2 -.1 -.6 -7.6 -10.1 -1.5 -.2 -3.0 -4.4 -8.5 -8.9 -9.9 -11.4 -8.3 -4.1 -7.7 -7.3 -6.3 -4.7 -1.7
-6.3 -3.9 -1.4 -.1 -.4 .0 -.1 -.2 -.2 -.4 -2.8 -5.7 -7.2 -5.0 -1.6 -.8 -.3 -.4 -.2 -5.1 -5.1 -1.0 .1 -.4 -1.3 -4.4 -1.7 -.7 -1.1 -.3 -1.3 -2.3 -.7 -1.2 -2.0 -4.3
-5.0 -5.0 -5.2 -4.0 -4.2 -3.4 -1.5 -.9 -.9 -.6 -.7 -2.0 -3.5 -3.9 -3.7 -3.1 -2.3 -.9 -.1 -.5 -1.1 -1.2 -.9 -.6 -.6 -.9 -.5 -.1 .0 .9 -1.3 -2.7 -2.8 -2.5 -1.5 -2.3
-2.0 -1.8 -2.1 -2.6 -3.9 -5.7 -4.8 -3.4 -2.3 -1.2 -1.2 -3.0 -2.8 -2.3 -3.2 -3.3 -4.5 -3.9 -1.6 -1.2 -1.7 -1.4 -1.0 -.9 -1.4 -1.3 -2.1 -1.7 -1.0 -1.2 -1.3 -1.4 -2.5 -4.4 -4.7 -2.1
-2.0 -2.3 -2.2 -2.0 -2.3 -3.1 -2.3 -2.7 -3.0 -2.6 -1.4 -2.1 -1.7 -2.0 -2.0 -2.6 -2.8 -3.5 -3.6 -2.8 -2.8 -2.8 -2.3 -2.2 -2.4 -2.4 -2.6 -2.4 -3.0 -2.6 -2.2 -2.3 -2.8 -3.1 -3.9 -3.6
-2.7 -2.8 -3.8 -3.5 -3.6 -4.7 -4.0 -3.8 -3.9 -3.5 -4.1 -3.4 -3.8 -3.6 -3.5 -3.5 -3.4 -3.4 -3.3 -3.0 -3.2 -2.8 -3.0 -2.3 -2.7 -2.5 -2.8 -2.6 -2.8 -3.1 -2.7 -2.6 -2.6 -2.6 -2.7 -3.3
-1.7 -1.6 -2.0 -1.8 -2.3 -3.7 -4.1 -4.2 -3.8 -3.7 -3.8 -4.9 -4.9 -4.1 -3.6 -3.4 -3.0 -2.7 -2.7 -2.8 -3.0 -3.0 -2.6 -1.5 -1.4 -2.4 -2.2 -1.8 -1.4 -2.2 -2.2 -1.6 -1.1 -1.6 -1.8 -1.7
-1.0 -.8 -.5 -.8 -1.9 -2.4 -3.1 -4.1 -4.4 -4.2 -5.0 -5.2 -5.4 -5.3 -4.7 -3.8 -2.1 -.7 -.7 -.7 -.5 -.2 -.2 .0 .0 -.1 .2 .3 .2 .2 .3 .4 .5 .5 .0 -.8
-.8 -.7 -.8 -.7 -.7 -.7 -1.2 -.9 -.8 -1.6 -2.0 -2.4 -2.4 -2.2 -1.6 -.9 -.2 .1 .1 .3 .3 .2 .3 .4 .5 .6 .6 .6 .5 .6 .6 .6 .3 .0 -.8 -.9

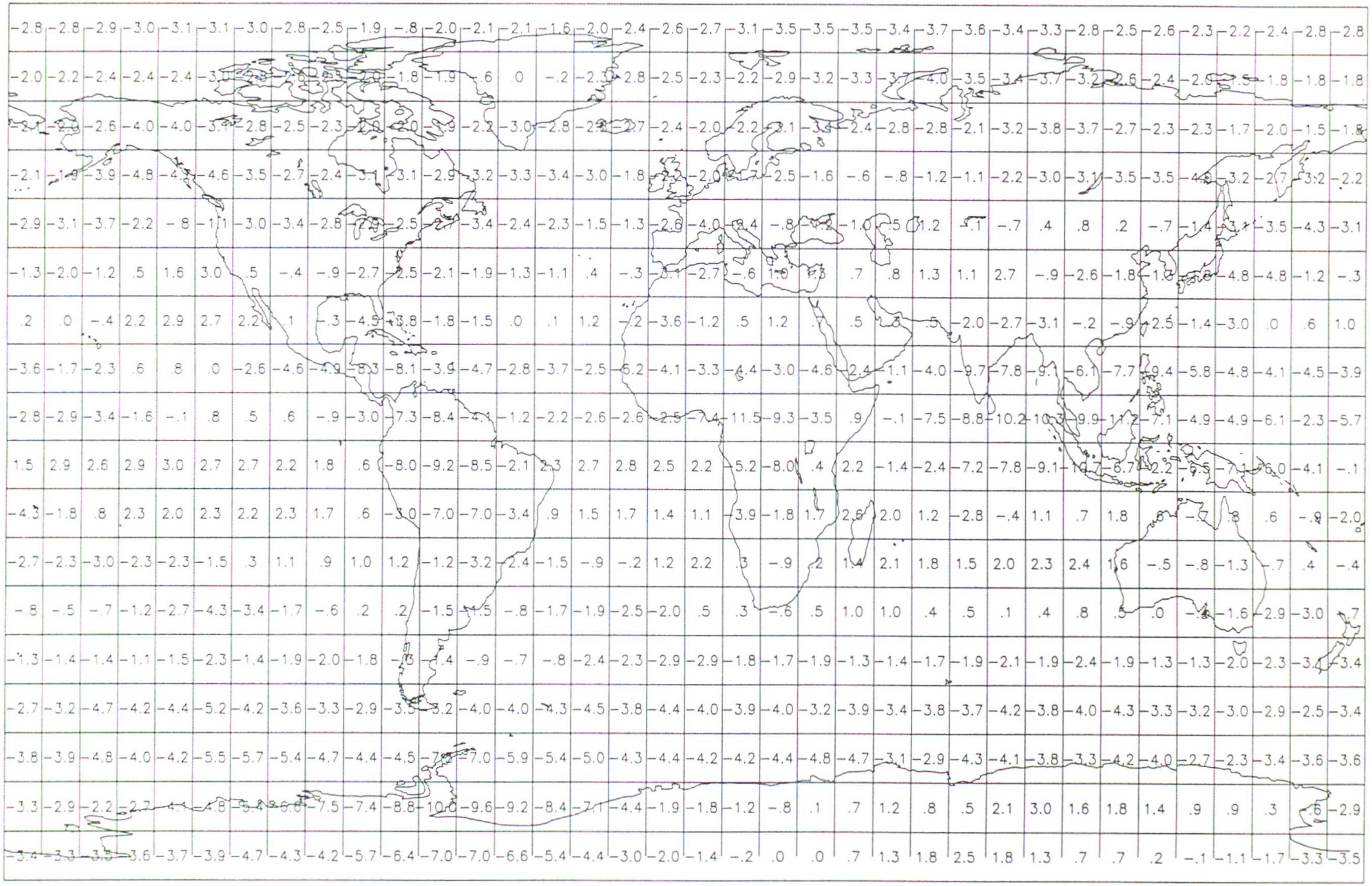
ATOVS : SD O–B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C) FIGURE 29
OCTOBER 1999 : HIRS15 channel (700 hPa)
NOAA–15, USING ALL OBSERVATIONS



1.4	1.3	1.1	1.1	1.2	1.3	1.3	1.2	1.3	1.6	1.8	1.4	1.3	1.5	1.9	1.6	1.4	1.5	1.8	2.2	2.7	2.4	2.2	2.3	2.3	2.6	2.8	2.9	2.5	2.2	2.0	1.6	1.4	1.3	1.5	1.5
1.2	1.3	1.4	1.4	1.5	2.0	1.9	1.3	1.5	1.8	1.8	1.9	2.3	2.2	1.9	3.1	3.4	3.3	2.9	3.2	3.7	3.5	3.6	3.8	3.9	3.8	3.2	3.1	2.8	2.4	2.3	2.0	1.5	1.5	1.3	1.2
1.8	2.3	3.2	4.4	4.4	3.4	2.9	2.4	2.0	2.0	2.0	2.3	3.1	4.1	4.3	4.5	5.0	4.6	4.1	4.1	4.8	4.5	4.1	4.4	4.1	3.5	3.1	3.4	3.6	2.8	2.4	2.9	2.7	3.0	2.6	2.0
3.9	3.4	5.7	6.4	5.7	5.7	4.9	3.9	3.5	4.1	3.8	3.7	4.6	5.4	6.0	5.5	4.6	5.4	4.8	4.2	4.7	4.1	3.8	4.3	4.3	4.0	4.1	4.6	4.1	4.2	4.0	4.6	4.5	4.2	5.3	4.1
6.4	6.1	6.8	6.2	5.2	5.4	5.7	5.9	5.5	3.9	5.6	6.5	7.5	6.8	6.5	5.4	4.9	5.6	7.0	8.5	4.0	4.7	5.4	4.0	2.9	4.2	4.9	4.3	4.0	3.7	4.1	5.5	[illegible]	7.2	7.5	6.5
6.7	7.4	6.2	5.2	3.7	2.2	2.7	3.8	5.4	7.6	8.2	8.0	7.3	6.9	6.4	3.9	4.3	7.9	6.8	5.1	2.9	3.8	3.9	2.7	2.5	4.6	5.5	6.2	6.4	6.6	6.8	7.5	10.4	9.4	7.0	6.0
5.2	5.5	6.2	2.6	1.1	1.2	2.4	5.5	6.7	11.7	10.2	8.0	7.8	6.0	6.0	3.5	6.1	8.0	4.4	2.3	1.6	3.1	2.6	2.4	4.8	8.9	9.8	9.1	6.7	7.6	8.5	7.7	9.2	6.0	4.7	4.9
8.8	8.1	8.3	5.4	5.1	5.7	8.5	10.3	9.8	11.9	12.2	9.5	11.0	9.3	9.4	8.6	14.2	9.5	9.5	9.9	9.3	9.6	7.1	7.3	9.6	12.4	11.6	11.8	11.0	12.5	12.9	10.8	9.9	9.2	10.0	9.5
9.0	9.3	9.7	7.8	5.3	4.0	4.7	5.8	7.0	8.9	10.7	11.9	9.6	8.6	8.2	8.8	9.1	9.9	11.7	13.2	12.3	9.3	5.1	6.2	11.9	11.4	12.0	[illegible]	11.9	12.3	11.1	10.3	10.4	11.3	9.1	12.0
4.3	2.3	1.9	1.1	.6	.9	.8	.7	.6	2.1	10.6	11.8	10.5	8.2	2.3	2.0	1.0	.9	2.4	11.3	11.8	5.4	2.3	7.0	7.9	11.2	10.8	10.8	12.1	11.0	9.8	11.6	10.7	10.8	10.0	6.2
9.9	7.9	4.9	2.5	3.8	1.1	.9	.9	1.1	2.1	6.5	10.2	10.5	8.9	4.2	2.9	1.8	1.2	1.0	9.0	8.3	4.0	2.6	2.2	4.0	8.7	4.6	3.8	4.7	3.2	4.9	6.5	3.6	4.9	7.8	8.9
7.9	7.3	7.3	6.7	7.2	6.6	4.6	3.4	3.6	2.5	2.5	6.5	8.4	7.6	6.9	5.8	4.9	2.6	1.3	4.5	5.1	4.4	4.0	2.1	2.2	3.3	2.5	1.6	1.1	2.3	5.1	5.9	6.8	6.4	4.7	6.3
4.8	4.3	4.7	5.8	7.0	8.0	6.9	5.7	4.8	3.7	4.1	6.9	7.3	5.9	6.8	6.3	6.6	5.7	3.6	4.0	5.0	3.8	2.6	2.4	3.6	3.8	4.9	4.0	3.0	3.5	4.0	5.8	6.5	7.5	7.1	5.0
4.0	4.3	4.5	4.3	4.9	5.5	4.8	5.3	5.1	4.5	4.2	5.5	4.7	4.2	3.8	4.3	4.2	5.1	5.2	4.4	4.6	4.7	4.1	3.7	4.2	4.2	4.4	4.0	4.7	4.1	3.6	4.2	5.0	5.1	5.8	5.9
3.7	3.8	4.3	4.2	4.3	5.1	4.5	4.6	4.9	4.7	5.2	5.6	5.7	5.3	4.8	4.5	4.0	4.0	3.9	3.8	4.1	3.8	4.0	3.1	3.6	3.5	3.6	3.3	3.8	4.1	3.6	3.5	3.6	3.8	3.9	4.4
2.8	3.1	3.3	3.1	3.6	4.4	4.5	4.2	4.3	4.4	4.3	6.6	6.6	5.3	4.6	4.4	3.4	3.5	3.4	3.5	3.8	3.5	3.8	3.0	2.8	3.1	2.9	3.0	3.1	4.4	4.4	3.5	3.0	3.3	3.4	3.1
2.1	1.7	1.8	2.3	3.6	4.4	4.8	5.3	6.3	5.8	6.6	7.4	7.5	7.5	7.0	6.0	4.7	3.4	2.9	2.7	2.3	1.6	1.4	1.4	1.7	1.7	1.4	1.3	1.7	2.2	2.2	2.1	2.2	2.1	2.8	2.4
3.1	3.0	3.1	3.3	3.1	3.1	3.5	3.7	3.7	4.0	4.5	5.5	6.2	6.0	4.9	3.8	2.6	2.0	1.9	1.8	1.7	1.8	1.7	1.8	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.5	2.0	3.2	3.1	3.0

ATOVS : MEAN O–B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)
OCTOBER 1999 : HIRS11 Channel (500–700 hPa)
NOAA–15, USING ALL OBSERVATIONS

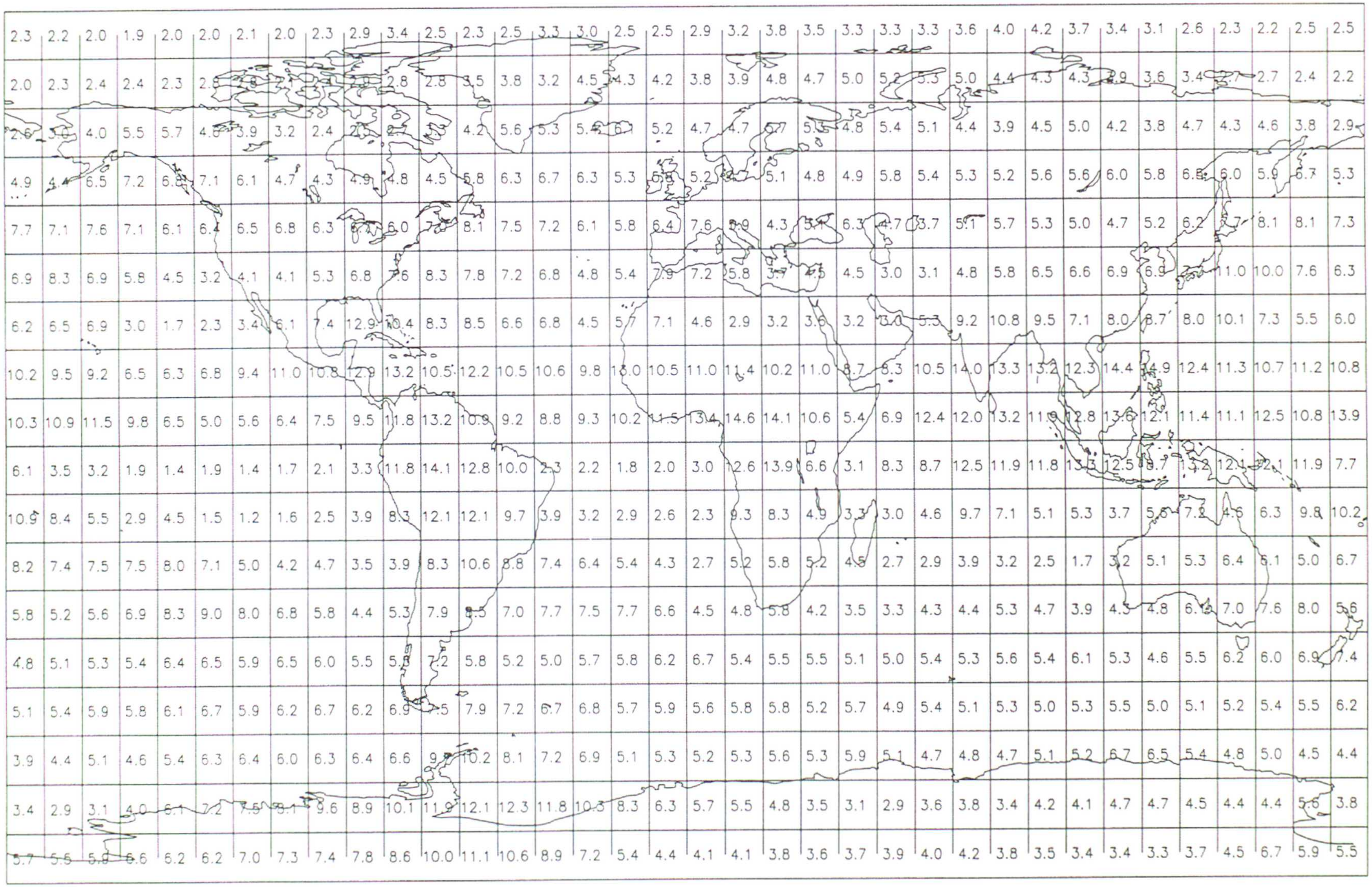
FIGURE 30



−2.8	−2.8	−2.9	−3.0	−3.1	−3.1	−3.0	−2.8	−2.5	−1.9	−.8	−2.0	−2.1	−2.1	−1.6	−2.0	−2.4	−2.6	−2.7	−3.1	−3.5	−3.5	−3.5	−3.4	−3.7	−3.6	−3.4	−3.3	−2.8	−2.5	−2.6	−2.3	−2.2	−2.4	−2.8	−2.8
−2.0	−2.2	−2.4	−2.4	−2.4	−3.0	−2.8	−2.6	−2.3	−2.0	−1.8	−1.9	.6	.0	−.2	−2.3	−2.8	−2.5	−2.3	−2.2	−2.9	−3.2	−3.3	−3.7	−4.0	−3.5	−3.4	−3.7	−3.2	−2.6	−2.4	−2.0	−1.5	−1.8	−1.8	−1.8
−2.1	−2.0	−2.6	−4.0	−4.0	−3.1	−2.8	−2.5	−2.3	−2.0	−2.0	−1.9	−2.2	−3.0	−2.8	−2.3	−2.7	−2.4	−2.0	−2.2	−3.1	−3.4	−2.4	−2.8	−2.8	−2.1	−3.2	−3.8	−3.7	−2.7	−2.3	−2.3	−1.7	−2.0	−1.5	−1.8
−2.1	−1.9	−3.9	−4.8	−4.3	−4.6	−3.5	−2.7	−2.4	−3.1	−3.1	−2.9	−3.2	−3.3	−3.4	−3.0	−1.8	−2.2	−2.0	−1.7	−2.5	−1.6	−.6	−.8	−1.2	−1.1	−2.2	−3.0	−3.1	−3.5	−3.5	−4.0	−3.2	−2.7	−3.2	−2.2
−2.9	−3.1	−3.7	−2.2	−.8	−1.1	−3.0	−3.4	−2.8	−2.9	−2.5	−2.7	−3.4	−2.4	−2.3	−1.5	−1.3	−2.6	−4.0	−3.4	−.8	−1.2	−1.0	−.5	1.2	−.1	−.7	.4	.8	.2	−.7	−1.4	−3.1	−3.5	−4.3	−3.1
−1.3	−2.0	−1.2	.5	1.6	3.0	.5	−.4	−.9	−2.7	−2.5	−2.1	−1.9	−1.3	−1.1	.4	−.3	−3.1	−2.7	−.6	1.0	1.3	.7	.8	1.3	1.1	2.7	−.9	−2.6	−1.8	−1.0	−.8	−4.8	−4.8	−1.2	−.3
.2	.0	−.4	2.2	2.9	2.7	2.2	.1	−.3	−4.5	−3.8	−1.8	−1.5	.0	.1	1.2	−.2	−3.6	−1.2	.5	1.2	.7	.5	.3	.5	−2.0	−2.7	−3.1	−.2	−.9	−2.5	−1.4	−3.0	.0	.6	1.0
−3.6	−1.7	−2.3	.6	.8	.0	−2.6	−4.6	−4.9	−8.3	−8.1	−3.9	−4.7	−2.8	−3.7	−2.5	−6.2	−4.1	−3.3	−4.4	−3.0	−4.6	−2.4	−1.1	−4.0	−9.7	−7.8	−9.1	−6.1	−7.7	−9.4	−5.8	−4.8	−4.1	−4.5	−3.9
−2.8	−2.9	−3.4	−1.6	−.1	.8	.5	.6	−.9	−3.0	−7.3	−8.4	−4.1	−1.2	−2.2	−2.6	−2.6	−2.5	−7.4	−11.5	−9.3	−3.5	.9	−.1	−7.5	−8.8	−10.2	−10.3	−9.9	−11.2	−7.1	−4.9	−4.9	−6.1	−2.3	−5.7
1.5	2.9	2.6	2.9	3.0	2.7	2.7	2.2	1.8	.6	−8.0	−9.2	−8.5	−2.1	2.3	2.7	2.8	2.5	2.2	−5.2	−8.0	.4	2.2	−1.4	−2.4	−7.2	−7.8	−9.1	−10.7	−6.7	−2.2	−6.5	−7.1	−6.0	−4.1	−.1
−4.3	−1.8	.8	2.3	2.0	2.3	2.2	2.3	1.7	.6	−3.0	−7.0	−7.0	−3.4	.9	1.5	1.7	1.4	1.1	−3.9	−1.8	1.7	2.6	2.0	1.2	−2.8	−.4	1.1	.7	1.8	.6	−.7	.8	.6	−.9	−2.0
−2.7	−2.3	−3.0	−2.3	−2.3	−1.5	.3	1.1	.9	1.0	1.2	−1.2	−3.2	−2.4	−1.5	−.9	−.2	1.2	2.2	.3	−.9	.2	1.4	2.1	1.8	1.5	2.0	2.3	2.4	1.6	−.5	−.8	−1.3	−.7	.4	−.4
−.8	−.5	−.7	−1.2	−2.7	−4.3	−3.4	−1.7	−.6	.2	.2	−1.5	−1.5	−.8	−1.7	−1.9	−2.5	−2.0	.5	.3	−.6	.5	1.0	1.0	.4	.5	.1	.4	.8	.5	.0	−.4	−1.6	−2.9	−3.0	.7
−1.3	−1.4	−1.4	−1.1	−1.5	−2.3	−1.4	−1.9	−2.0	−1.8	−.8	−1.4	−.9	−.7	−.8	−2.4	−2.3	−2.9	−2.9	−1.8	−1.7	−1.9	−1.3	−1.4	−1.7	−1.9	−2.1	−1.9	−2.4	−1.9	−1.3	−1.3	−2.0	−2.3	−3.4	−3.4
−2.7	−3.2	−4.7	−4.2	−4.4	−5.2	−4.2	−3.6	−3.3	−2.9	−3.5	−3.2	−4.0	−4.0	−4.3	−4.5	−3.8	−4.4	−4.0	−3.9	−4.0	−3.2	−3.9	−3.4	−3.8	−3.7	−4.2	−3.8	−4.0	−4.3	−3.3	−3.2	−3.0	−2.9	−2.5	−3.4
−3.8	−3.9	−4.8	−4.0	−4.2	−5.5	−5.7	−5.4	−4.7	−4.4	−4.5	−7.5	−7.0	−5.9	−5.4	−5.0	−4.3	−4.4	−4.2	−4.2	−4.4	−4.8	−4.7	−3.1	−2.9	−4.3	−4.1	−3.8	−3.3	−4.2	−4.0	−2.7	−2.3	−3.4	−3.6	−3.6
−3.3	−2.9	−2.2	−2.7	−4.1	−4.8	−5.4	−6.6	−7.5	−7.4	−8.8	−10.0	−9.6	−9.2	−8.4	−7.1	−4.4	−1.9	−1.8	−1.2	−.8	.1	.7	1.2	.8	.5	2.1	3.0	1.6	1.8	1.4	.9	.9	.3	.6	−2.9
−3.4	−3.3	−3.5	−3.6	−3.7	−3.9	−4.7	−4.3	−4.2	−5.7	−6.4	−7.0	−7.0	−6.6	−5.4	−4.4	−3.0	−2.0	−1.4	−.2	.0	.0	.7	1.3	1.8	2.5	1.8	1.3	.7	.7	.2	−.1	−1.1	−1.7	−3.3	−3.5

ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
OCTOBER 1999 : HIRS11 channel (500-700 hPa)
NOAA-15, USING ALL OBSERVATIONS

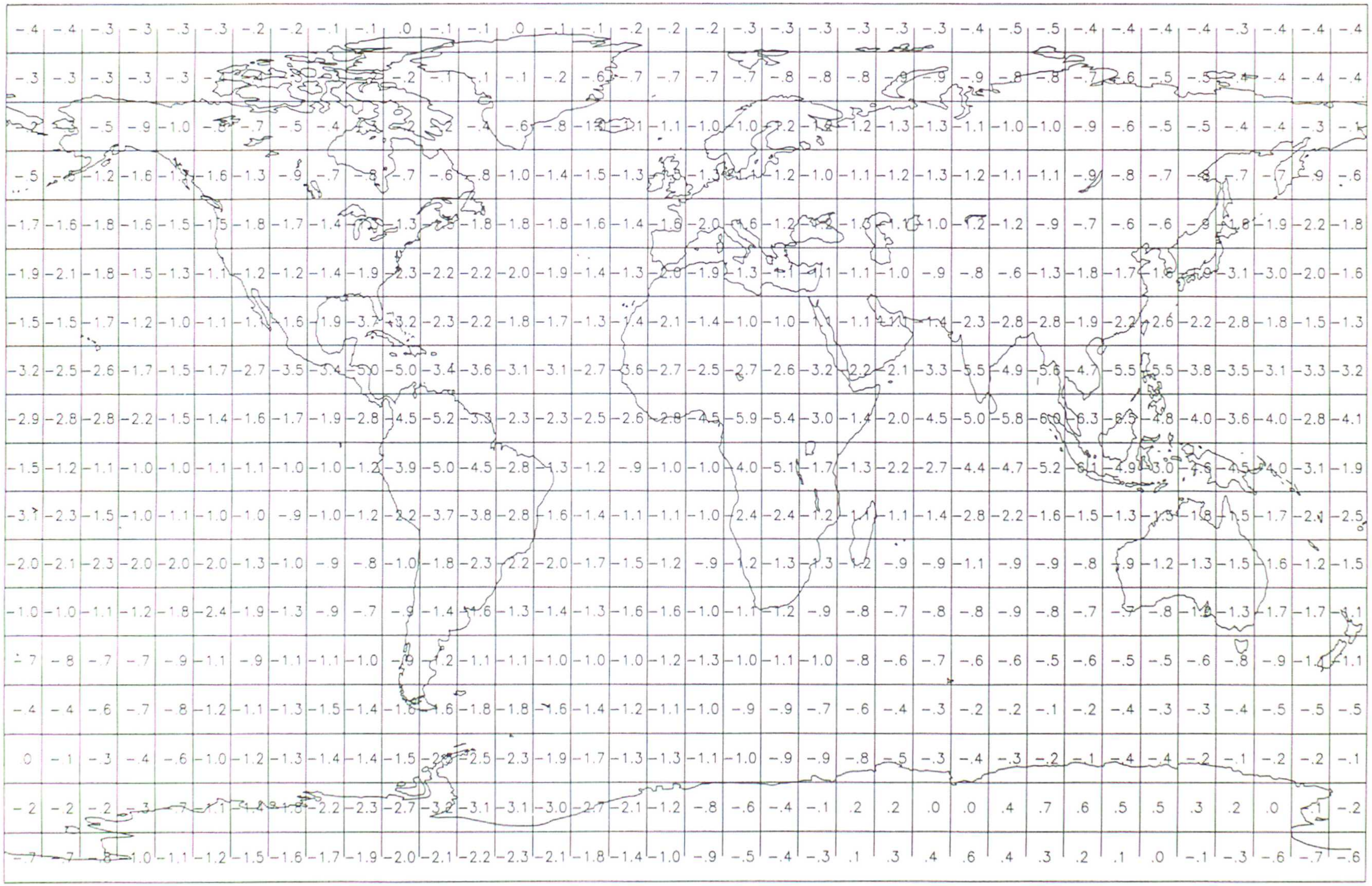
FIGURE 31


2.3 2.2 2.0 1.9 2.0 2.0 2.1 2.0 2.3 2.9 3.4 2.5 2.3 2.5 3.3 3.0 2.5 2.5 2.9 3.2 3.8 3.5 3.3 3.3 3.3 3.6 4.0 4.2 3.7 3.4 3.1 2.6 2.3 2.2 2.5 2.5
2.0 2.3 2.4 2.4 2.3 2.8 2.8 2.1 2.1 2.0 2.8 2.8 3.5 3.8 3.2 4.5 4.3 4.2 3.8 3.9 4.8 4.7 5.0 5.2 5.3 5.0 4.4 4.3 4.3 2.9 3.6 3.4 2.7 2.7 2.4 2.2
2.6 3.0 4.0 5.5 5.7 4.6 3.9 3.2 2.4 2.5 2.7 3.3 4.2 5.6 5.3 5.4 6.1 5.2 4.7 4.7 5.7 5.3 4.8 5.4 5.1 4.4 3.9 4.5 5.0 4.2 3.8 4.7 4.3 4.6 3.8 2.9
4.9 4.4 6.5 7.2 6.8 7.1 6.1 4.7 4.3 4.9 4.8 4.5 5.8 6.3 6.7 6.3 5.3 5.8 5.2 4.7 5.1 4.8 4.9 5.8 5.4 5.3 5.2 5.6 5.6 6.0 5.8 6.5 6.0 5.9 6.7 5.3
7.7 7.1 7.6 7.1 6.1 6.4 6.5 6.8 6.3 6.7 6.0 [illegible] 8.1 7.5 7.2 6.1 5.8 6.4 7.6 8.9 4.3 5.1 6.3 4.7 3.7 5.1 5.7 5.3 5.0 4.7 5.2 6.2 [illegible] 8.1 8.1 7.3
6.9 8.3 6.9 5.8 4.5 3.2 4.1 4.1 5.3 6.8 7.6 8.3 7.8 7.2 6.8 4.8 5.4 7.9 7.2 5.8 3.7 4.5 4.5 3.0 3.1 4.8 5.8 6.5 6.6 6.9 6.9 [illegible] 11.0 10.0 7.6 6.3
6.2 6.5 6.9 3.0 1.7 2.3 3.4 6.1 7.4 12.9 10.4 8.3 8.5 6.6 6.8 4.5 5.7 7.1 4.6 2.9 3.2 3.6 3.2 3.0 5.3 9.2 10.8 9.5 7.1 8.0 8.7 8.0 10.1 7.3 5.5 6.0
10.2 9.5 9.2 6.5 6.3 6.8 9.4 11.0 10.8 12.9 13.2 10.5 12.2 10.5 10.6 9.8 13.0 10.5 11.0 11.4 10.2 11.0 8.7 8.3 10.5 14.0 13.3 13.2 12.3 14.4 14.9 12.4 11.3 10.7 11.2 10.8
10.3 10.9 11.5 9.8 6.5 5.0 5.6 6.4 7.5 9.5 11.8 13.2 10.9 9.2 8.8 9.3 10.2 11.5 13.4 14.6 14.1 10.6 5.4 6.9 12.4 12.0 13.2 11.9 12.8 13.6 12.1 11.4 11.1 12.5 10.8 13.9
6.1 3.5 3.2 1.9 1.4 1.9 1.4 1.7 2.1 3.3 11.8 14.1 12.8 10.0 2.3 2.2 1.8 2.0 3.0 12.6 13.9 6.6 3.1 8.3 8.7 12.5 11.9 11.8 13.3 12.5 8.7 13.2 12.1 12.1 11.9 7.7
10.9 8.4 5.5 2.9 4.5 1.5 1.2 1.6 2.5 3.9 8.3 12.1 12.1 9.7 3.9 3.2 2.9 2.6 2.3 9.3 8.3 4.9 3.3 3.0 4.6 9.7 7.1 5.1 5.3 3.7 5.6 7.2 4.6 6.3 9.8 10.2
8.2 7.4 7.5 7.5 8.0 7.1 5.0 4.2 4.7 3.5 3.9 8.3 10.6 8.8 7.4 6.4 5.4 4.3 2.7 5.2 5.8 5.2 4.5 2.7 2.9 3.9 3.2 2.5 1.7 3.2 5.1 5.3 6.4 6.1 5.0 6.7
5.8 5.2 5.6 6.9 8.3 9.0 8.0 6.8 5.8 4.4 5.3 7.9 8.5 7.0 7.7 7.5 7.7 6.6 4.5 4.8 5.8 4.2 3.5 3.3 4.3 4.4 5.3 4.7 3.9 4.3 4.8 6.1 7.0 7.6 8.0 5.6
4.8 5.1 5.3 5.4 6.4 6.5 5.9 6.5 6.0 5.5 5.8 7.2 5.8 5.2 5.0 5.7 5.8 6.2 6.7 5.4 5.5 5.5 5.1 5.0 5.4 5.3 5.6 5.4 6.1 5.3 4.6 5.5 6.2 6.0 6.9 7.4
5.1 5.4 5.9 5.8 6.1 6.7 5.9 6.2 6.7 6.2 6.9 7.5 7.9 7.2 6.7 6.8 5.7 5.9 5.6 5.8 5.8 5.2 5.7 4.9 5.4 5.1 5.3 5.0 5.3 5.5 5.0 5.1 5.2 5.4 5.5 6.2
3.9 4.4 5.1 4.6 5.4 6.3 6.4 6.0 6.3 6.4 6.6 [illegible] 10.2 8.1 7.2 6.9 5.1 5.3 5.2 5.3 5.6 5.3 5.9 5.1 4.7 4.8 4.7 5.1 5.2 6.7 6.5 5.4 4.8 5.0 4.5 4.4
3.4 2.9 3.1 4.0 6.1 7.2 7.5 8.1 9.6 8.9 10.1 11.9 12.1 12.3 11.8 10.3 8.3 6.3 5.7 5.5 4.8 3.5 3.1 2.9 3.6 3.8 3.4 4.2 4.1 4.7 4.7 4.5 4.4 4.4 5.6 3.8
5.7 5.5 5.8 6.6 6.2 6.2 7.0 7.3 7.4 7.8 8.6 10.0 11.1 10.6 8.9 7.2 5.4 4.4 4.1 4.1 3.8 3.6 3.7 3.9 4.0 4.2 3.8 3.5 3.4 3.4 3.3 3.7 4.5 6.7 5.9 5.5

ATOVS : MEAN O–B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C) FIGURE 32

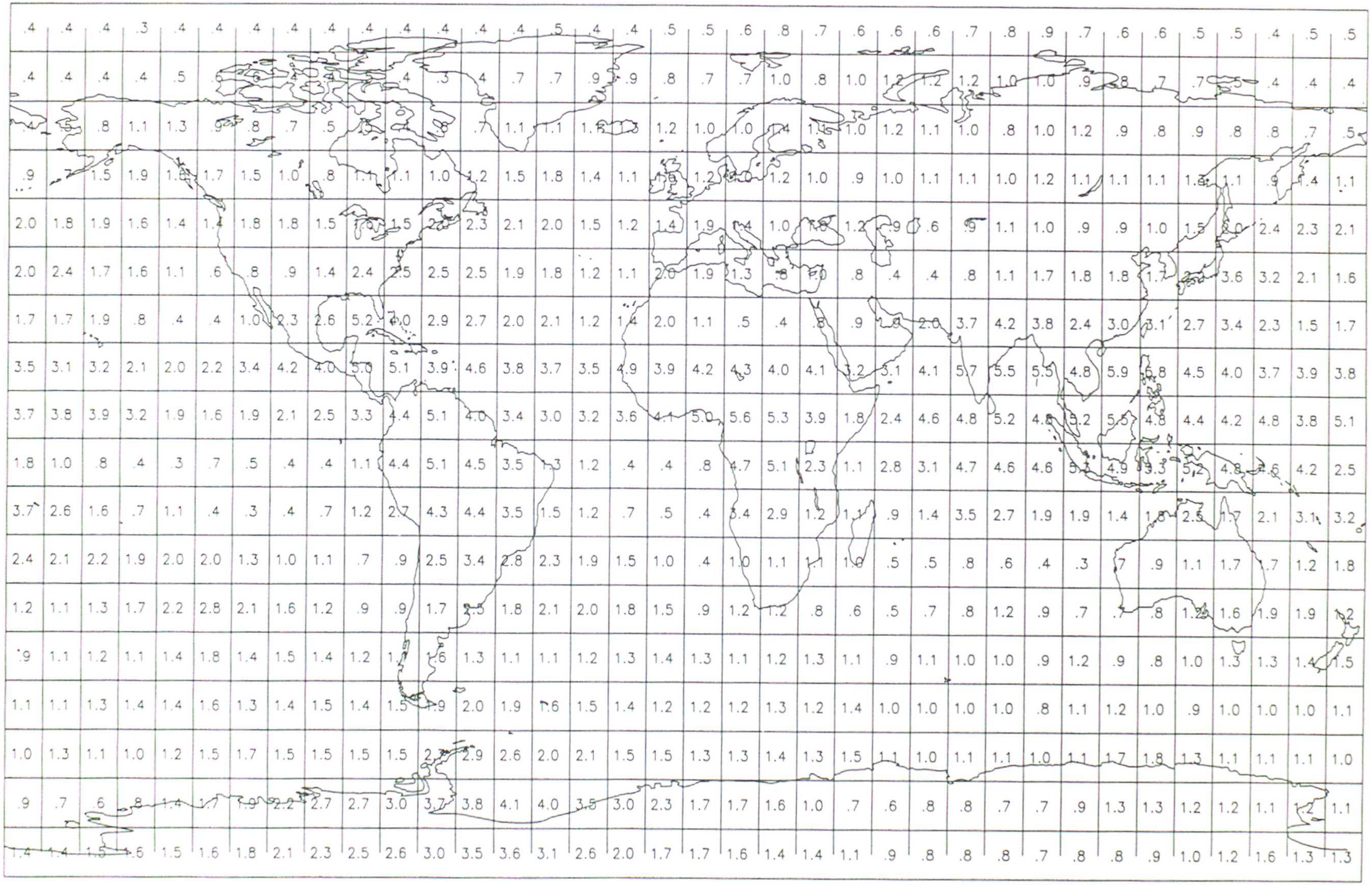
OCTOBER 1999 : HIRS4 channel (400 hPa)

NOAA–15, USING ALL OBSERVATIONS

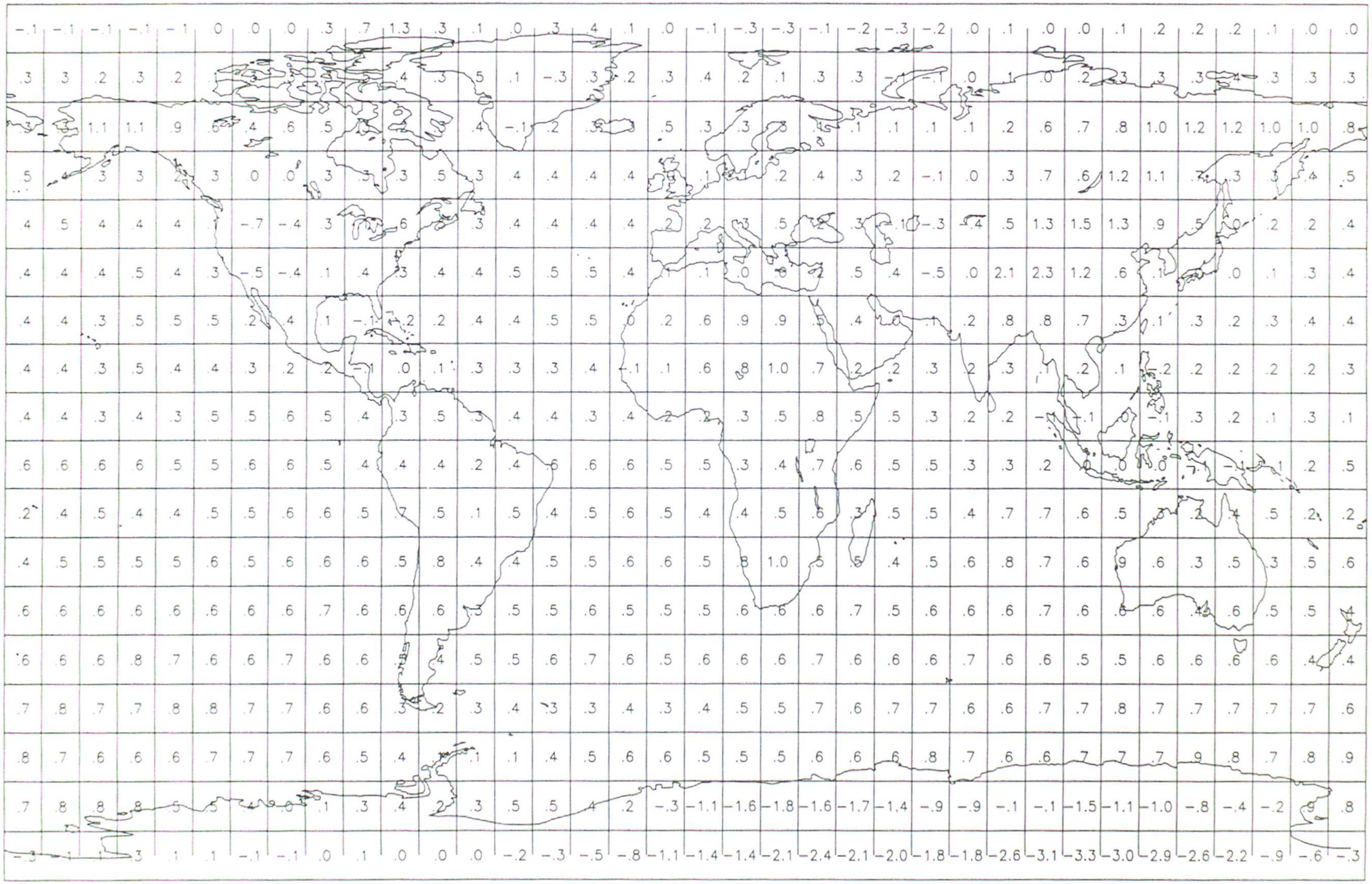

-.4 -.4 -.3 -.3 -.3 -.3 -.2 -.2 -.1 -.1 .0 -.1 -.1 .0 -.1 -.1 -.2 -.2 -.2 -.3 -.3 -.3 -.3 -.3 -.3 -.4 -.5 -.5 -.4 -.4 -.4 -.4 -.3 -.4 -.4 -.4
-.3 -.3 -.3 -.3 -.3 [illegible] -.4 [illegible] [illegible] [illegible] -.2 -.1 -.1 -.1 -.2 -.6 -.7 -.7 -.7 -.7 -.8 -.8 -.8 -.9 -.9 -.9 -.8 -.8 -.7 -.6 -.5 -.5 -.4 -.4 -.4 -.4
-.2 [illegible] -.5 -.9 -1.0 -.8 -.7 -.5 -.4 [illegible] -.2 -.2 -.4 -.6 -.8 -1.3 -1.1 -1.1 -1.0 -1.0 -1.2 [illegible] -1.2 -1.3 -1.3 -1.1 -1.0 -1.0 -.9 -.6 -.5 -.5 -.4 -.4 -.3 -.1
-.5 [illegible] -1.2 -1.6 [illegible] -1.6 -1.3 -.9 -.7 -.8 -.7 -.6 -.8 -1.0 -1.4 -1.5 -1.3 [illegible] -1.3 -1.1 -1.2 -1.0 -1.1 -1.2 -1.3 -1.2 -1.1 -1.1 -.9 -.8 -.7 -.8 -.7 -.7 -.9 -.6
-1.7 -1.6 -1.8 -1.6 -1.5 -1.5 -1.8 -1.7 -1.4 [illegible] -1.3 [illegible] -1.8 -1.8 -1.8 -1.6 -1.4 -1.6 -2.0 -1.6 -1.2 [illegible] -1.6 -1.1 -1.0 -1.2 -1.2 -.9 -.7 -.6 -.6 -.9 -1.8 -1.9 -2.2 -1.8
-1.9 -2.1 -1.8 -1.5 -1.3 -1.1 -1.2 -1.2 -1.4 -1.9 -2.3 -2.2 -2.2 -2.0 -1.9 -1.4 -1.3 -2.0 -1.9 -1.3 -1.1 -1.1 -1.1 -1.0 -.9 -.8 -.6 -1.3 -1.8 -1.7 -1.6 [illegible] -3.1 -3.0 -2.0 -1.6
-1.5 -1.5 -1.7 -1.2 -1.0 -1.1 [illegible] -1.6 -1.9 -3.7 -3.2 -2.3 -2.2 -1.8 -1.7 -1.3 -1.4 -2.1 -1.4 -1.0 -1.0 [illegible] -1.1 -1.1 -1.4 -2.3 -2.8 -2.8 -1.9 -2.2 -2.6 -2.2 -2.8 -1.8 -1.5 -1.3
-3.2 -2.5 -2.6 -1.7 -1.5 -1.7 -2.7 -3.5 -3.4 -5.0 -5.0 -3.4 -3.6 -3.1 -3.1 -2.7 -3.6 -2.7 -2.5 -2.7 -2.6 -3.2 -2.2 -2.1 -3.3 -5.5 -4.9 -5.6 -4.7 -5.5 -5.5 -3.8 -3.5 -3.1 -3.3 -3.2
-2.9 -2.8 -2.8 -2.2 -1.5 -1.4 -1.6 -1.7 -1.9 -2.8 -4.5 -5.2 -3.3 -2.3 -2.3 -2.5 -2.6 -2.8 -4.5 -5.9 -5.4 -3.0 -1.4 -2.0 -4.5 -5.0 -5.8 -6.0 -6.3 -6.5 -4.8 -4.0 -3.6 -4.0 -2.8 -4.1
-1.5 -1.2 -1.1 -1.0 -1.0 -1.1 -1.1 -1.0 -1.0 -1.2 -3.9 -5.0 -4.5 -2.8 -1.3 -1.2 -.9 -1.0 -1.0 -4.0 -5.1 -1.7 -1.3 -2.2 -2.7 -4.4 -4.7 -5.2 -6.1 -4.9 -3.0 -4.6 -4.5 -4.0 -3.1 -1.9
-3.1 -2.3 -1.5 -1.0 -1.1 -1.0 -1.0 -.9 -1.0 -1.2 -2.2 -3.7 -3.8 -2.8 -1.6 -1.4 -1.1 -1.1 -1.0 -2.4 -2.4 -1.2 -1.1 -1.1 -1.4 -2.8 -2.2 -1.6 -1.5 -1.3 -1.5 -1.8 -1.5 -1.7 -2.1 -2.5
-2.0 -2.1 -2.3 -2.0 -2.0 -2.0 -1.3 -1.0 -.9 -.8 -1.0 -1.8 -2.3 -2.2 -2.0 -1.7 -1.5 -1.2 -.9 -1.2 -1.3 -1.3 -1.2 -.9 -.9 -1.1 -.9 -.9 -.8 -.9 -1.2 -1.3 -1.5 -1.6 -1.2 -1.5
-1.0 -1.0 -1.1 -1.2 -1.8 -2.4 -1.9 -1.3 -.9 -.7 -.9 -1.4 -1.6 -1.3 -1.4 -1.3 -1.6 -1.6 -1.0 -1.1 -1.2 -.9 -.8 -.7 -.8 -.8 -.9 -.8 -.7 -.7 -.8 [illegible] -1.3 -1.7 -1.7 -1.1
-.7 -.8 -.7 -.7 -.9 -1.1 -.9 -1.1 -1.1 -1.0 -.9 -1.2 -1.1 -1.1 -1.0 -1.0 -1.0 -1.2 -1.3 -1.0 -1.1 -1.0 -.8 -.6 -.7 -.6 -.6 -.5 -.6 -.5 -.5 -.6 -.8 -.9 -1.4 -1.1
-.4 -.4 -.6 -.7 -.8 -1.2 -1.1 -1.3 -1.5 -1.4 -1.6 -1.6 -1.8 -1.8 -1.6 -1.4 -1.2 -1.1 -1.0 -.9 -.9 -.7 -.6 -.4 -.3 -.2 -.2 -.1 -.2 -.4 -.3 -.3 -.4 -.5 -.5 -.5
.0 -.1 -.3 -.4 -.6 -1.0 -1.2 -1.3 -1.4 -1.4 -1.5 -2.8 -2.5 -2.3 -1.9 -1.7 -1.3 -1.3 -1.1 -1.0 -.9 -.9 -.8 -.5 -.3 -.4 -.3 -.2 -.1 -.4 -.4 -.2 -.1 -.2 -.2 -.1
-.2 -.2 -.2 -.3 -.7 -1.1 -1.4 -1.8 -2.2 -2.3 -2.7 -3.2 -3.1 -3.1 -3.0 -2.7 -2.1 -1.2 -.8 -.6 -.4 -.1 .2 .2 .0 .0 .4 .7 .6 .5 .5 .3 .2 .0 -.1 -.2
-.7 -.7 -.8 -1.0 -1.1 -1.2 -1.5 -1.6 -1.7 -1.9 -2.0 -2.1 -2.2 -2.3 -2.1 -1.8 -1.4 -1.0 -.9 -.5 -.4 -.3 .1 .3 .4 .6 .4 .3 .2 .1 .0 -.1 -.3 -.6 -.7 -.6

ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
OCTOBER 1999 : HIRS4 channel (400 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 33

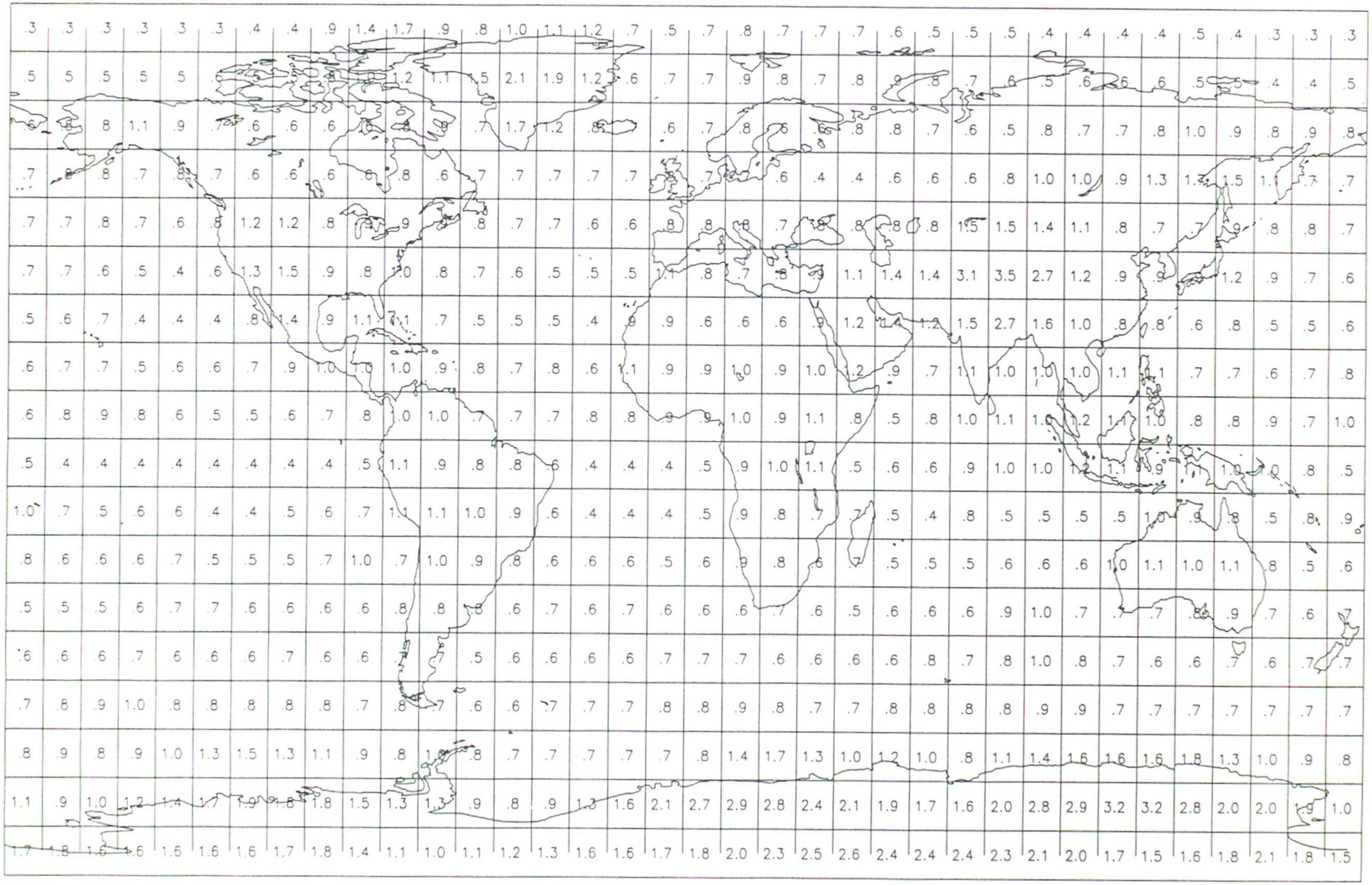

.4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .5 .5 .6 .8 .7 .6 .6 .6 .7 .8 .9 .7 .6 .6 .5 .5 .4 .5 .5
.4 .4 .4 .4 .5 .6 .6 .4 .4 .4 .3 .4 .7 .7 .9 .9 .8 .7 .7 1.0 .8 1.0 1.2 1.2 1.2 1.0 1.0 .9 .8 .7 .7 .5 .4 .4 .4
.4 .5 .8 1.1 1.3 .9 .8 .7 .5 .5 .8 .7 1.1 1.1 1.1 1.3 1.2 1.0 1.0 1.4 1.1 1.0 1.2 1.1 1.0 .8 1.0 1.2 .9 .8 .9 .8 .8 .7 .5
.9 .7 1.5 1.9 1.8 1.7 1.5 1.0 .8 1.1 1.1 1.0 1.2 1.5 1.8 1.4 1.1 1.2 1.0 1.2 1.0 .9 1.0 1.1 1.1 1.0 1.2 1.1 1.1 1.1 1.3 1.1 .9 1.4 1.1
2.0 1.8 1.9 1.6 1.4 1.4 1.8 1.8 1.5 1.6 1.5 2.3 2.1 2.0 1.5 1.2 1.4 1.9 1.4 1.0 1.2 .9 .6 .9 1.1 1.0 .9 .9 1.0 1.5 2.0 2.4 2.3 2.1
2.0 2.4 1.7 1.6 1.1 .6 .8 .9 1.4 2.4 2.5 2.5 2.5 1.9 1.8 1.2 1.1 2.0 1.9 1.3 .8 1.0 .8 .4 .4 .8 1.1 1.7 1.8 1.8 1.7 3.6 3.2 2.1 1.6
1.7 1.7 1.9 .8 .4 .4 1.0 2.3 2.6 5.2 4.0 2.9 2.7 2.0 2.1 1.2 1.4 2.0 1.1 .5 .4 .8 .9 .9 2.0 3.7 4.2 3.8 2.4 3.0 3.1 2.7 3.4 2.3 1.5 1.7
3.5 3.1 3.2 2.1 2.0 2.2 3.4 4.2 4.0 5.0 5.1 3.9 4.6 3.8 3.7 3.5 4.9 3.9 4.2 4.3 4.0 4.1 3.2 3.1 4.1 5.7 5.5 5.5 4.8 5.9 6.8 4.5 4.0 3.7 3.9 3.8
3.7 3.8 3.9 3.2 1.9 1.6 1.9 2.1 2.5 3.3 4.4 5.1 4.0 3.4 3.0 3.2 3.6 4.1 5.0 5.6 5.3 3.9 1.8 2.4 4.6 4.8 5.2 4.8 5.2 5.5 4.8 4.4 4.2 4.8 3.8 5.1
1.8 1.0 .8 .4 .3 .7 .5 .4 .4 1.1 4.4 5.1 4.5 3.5 1.3 1.2 .4 .4 .8 4.7 5.1 2.3 1.1 2.8 3.1 4.7 4.6 4.6 5.3 4.9 3.3 5.2 4.8 4.6 4.2 2.5
3.7 2.6 1.6 .7 1.1 .4 .3 .4 .7 1.2 2.7 4.3 4.4 3.5 1.5 1.2 .7 .5 .4 3.4 2.9 1.2 1.1 .9 1.4 3.5 2.7 1.9 1.9 1.4 1.8 2.5 1.7 2.1 3.1 3.2
2.4 2.1 2.2 1.9 2.0 2.0 1.3 1.0 1.1 .7 .9 2.5 3.4 2.8 2.3 1.9 1.5 1.0 .4 1.0 1.1 1.1 1.0 .5 .5 .8 .6 .4 .3 .7 .9 1.1 1.7 .7 1.2 1.8
1.2 1.1 1.3 1.7 2.2 2.8 2.1 1.6 1.2 .9 .9 1.7 2.5 1.8 2.1 2.0 1.8 1.5 .9 1.2 1.2 .8 .6 .5 .7 .8 1.2 .9 .7 .7 .8 1.2 1.6 1.9 1.9 1.2
.9 1.1 1.2 1.1 1.4 1.8 1.4 1.5 1.4 1.2 1.6 1.3 1.1 1.1 1.2 1.3 1.4 1.3 1.1 1.2 1.3 1.1 .9 1.1 1.0 1.0 .9 1.2 .9 .8 1.0 1.3 1.3 1.4 1.5
1.1 1.1 1.3 1.4 1.4 1.6 1.3 1.4 1.5 1.4 1.5 1.9 2.0 1.9 1.6 1.5 1.4 1.2 1.2 1.2 1.3 1.2 1.4 1.0 1.0 1.0 1.0 .8 1.1 1.2 1.0 .9 1.0 1.0 1.0 1.1
1.0 1.3 1.1 1.0 1.2 1.5 1.7 1.5 1.5 1.5 1.5 2.7 2.9 2.6 2.0 2.1 1.5 1.5 1.3 1.3 1.4 1.3 1.5 1.1 1.0 1.1 1.1 1.0 1.1 1.7 1.8 1.3 1.1 1.1 1.1 1.0
.9 .7 .6 .8 1.4 1.7 1.9 2.2 2.7 2.7 3.0 3.7 3.8 4.1 4.0 3.5 3.0 2.3 1.7 1.7 1.6 1.0 .7 .6 .8 .8 .7 .7 .9 1.3 1.3 1.2 1.2 1.1 1.2 1.1
1.4 1.4 1.5 1.6 1.5 1.6 1.8 2.1 2.3 2.5 2.6 3.0 3.5 3.6 3.1 2.6 2.0 1.7 1.7 1.6 1.4 1.4 1.1 .9 .8 .8 .8 .7 .8 .8 .9 1.0 1.2 1.6 1.3 1.3

ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C) FIGURE 34
OCTOBER 1999 : AMSUA-5 Channel (700 hPa)
NOAA-15, USING ALL OBSERVATIONS

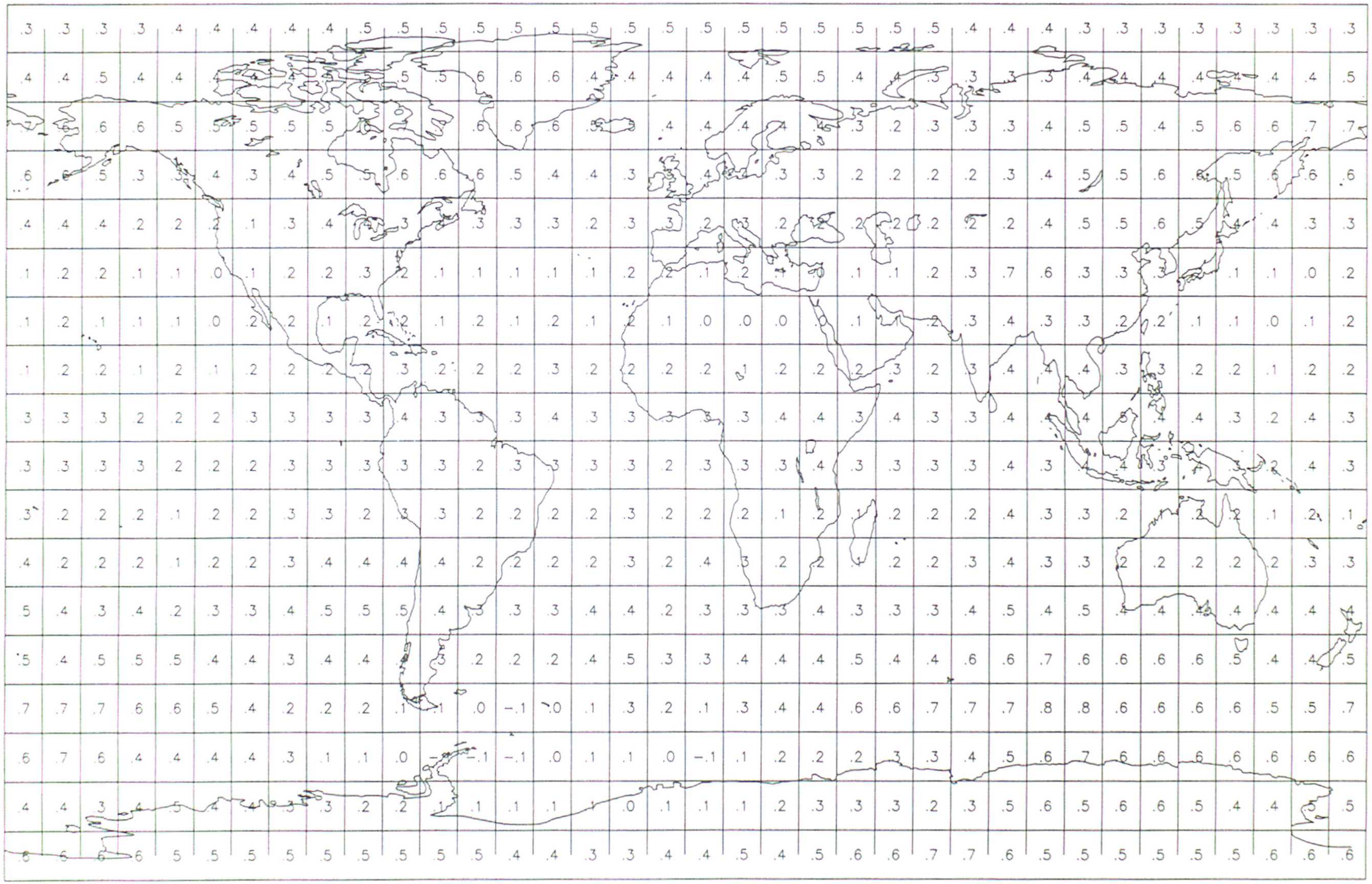

-.1 -.1 -.1 -.1 -.1 .0 .0 .0 .3 .7 1.3 .3 .1 .0 .3 .4 .1 .0 -.1 -.3 -.3 -.1 -.2 -.3 -.2 .0 .1 .0 .0 .1 .2 .2 .2 .1 .0 .0
.3 .3 .2 .3 .2 .1 .3 [illegible] .3 [illegible] .4 .3 .5 .1 -.3 .3 .2 .3 .4 .2 .1 .3 .3 -.1 -.1 .0 .1 .0 .2 .3 .3 .3 .4 .3 .3 .3
.3 .3 1.1 1.1 .9 .6 .4 .6 .5 [illegible] [illegible] [illegible] .4 -.1 .2 .3 .3 .5 .3 .3 .3 .1 .1 .1 .1 .1 .2 .6 .7 .8 1.0 1.2 1.2 1.0 1.0 .8
.5 .4 .3 .3 .2 .3 .0 .0 .3 .3 .3 .5 .3 .4 .4 .4 .4 [illegible] .1 [illegible] .2 .4 .3 .2 -.1 .0 .3 .7 .6 1.2 1.1 .7 .3 .3 .4 .5
.4 .5 .4 .4 .4 .1 -.7 -.4 .3 .1 .6 [illegible] .3 .4 .4 .4 .4 .2 .2 .3 .5 .2 .3 -.1 -.3 -.4 .5 1.3 1.5 1.3 .9 .5 .0 .2 .2 .4
.4 .4 .4 .5 .4 .3 -.5 -.4 .1 .4 .3 .4 .4 .5 .5 .5 .4 .1 .1 .0 .0 .2 .5 .4 -.5 .0 2.1 2.3 1.2 .6 .1 [illegible] .0 .1 .3 .4
.4 .4 .3 .5 .5 .5 .2 .4 .1 -.1 .2 .2 .4 .4 .5 .5 .0 .2 .6 .9 .9 .5 .4 .0 .1 .2 .8 .8 .7 .3 .1 .3 .2 .3 .4 .4
.4 .4 .3 .5 .4 .4 .3 .2 .2 -.1 .0 .1 .3 .3 .3 .4 -.1 .1 .6 .8 1.0 .7 .2 .2 .3 .2 .3 .1 .2 .1 -.2 .2 .2 .2 .2 .3
.4 .4 .3 .4 .3 .5 .5 .6 .5 .4 .3 .5 .3 .4 .4 .3 .4 .2 .2 .3 .5 .8 .5 .5 .3 .2 .2 -.1 -.1 .0 -.1 .3 .2 .1 .3 .1
.6 .6 .6 .6 .5 .5 .6 .6 .5 .4 .4 .4 .2 .4 .6 .6 .6 .5 .5 .3 .4 .7 .6 .5 .5 .3 .3 .2 .0 .0 .0 -.1 -.1 .1 .2 .5
.2 .4 .5 .4 .4 .5 .5 .6 .6 .5 .7 .5 .1 .5 .4 .5 .6 .5 .4 .4 .5 .6 .3 .5 .5 .4 .7 .7 .6 .5 .3 .2 .4 .5 .2 .2
.4 .5 .5 .5 .5 .6 .5 .6 .6 .6 .5 .8 .4 .4 .5 .5 .6 .6 .5 .8 1.0 .5 .5 .4 .5 .6 .8 .7 .6 .9 .6 .3 .5 .3 .5 .6
.6 .6 .6 .6 .6 .6 .6 .6 .7 .6 .6 .6 .3 .5 .5 .6 .5 .5 .5 .6 .6 .6 .7 .5 .6 .6 .6 .7 .6 .6 .6 .4 .6 .5 .5 .4
.6 .6 .6 .8 .7 .6 .6 .7 .6 .6 [illegible] .4 .5 .5 .6 .7 .6 .5 .6 .6 .6 .7 .6 .6 .6 .7 .6 .6 .5 .5 .6 .6 .6 .6 .4 .4
.7 .8 .7 .7 .8 .8 .7 .7 .6 .6 .3 .2 .3 .4 .3 .3 .4 .3 .4 .5 .5 .7 .6 .7 .7 .6 .6 .7 .7 .8 .7 .7 .7 .7 .7 .6
.8 .7 .6 .6 .6 .7 .7 .7 .6 .5 .4 [illegible] .1 .1 .4 .5 .6 .6 .5 .5 .5 .6 .6 .6 .8 .7 .6 .6 .7 .7 .7 .9 .8 .7 .8 .9
.7 .8 .8 .8 .5 .5 .4 .0 .1 .3 .4 .2 .3 .5 .5 .4 .2 -.3 -1.1 -1.6 -1.8 -1.6 -1.7 -1.4 -.9 -.9 -.1 -.1 -1.5 -1.1 -1.0 -.8 -.4 -.2 .9 .8
-.3 -.1 .1 .3 .1 .1 -.1 -.1 .0 .1 .0 .0 .0 -.2 -.3 -.5 -.8 -1.1 -1.4 -1.4 -2.1 -2.4 -2.1 -2.0 -1.8 -1.8 -2.6 -3.1 -3.3 -3.0 -2.9 -2.6 -2.2 -.9 -.6 -.3

ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
OCTOBER 1999 : AMSUA-5 channel (700 hPa)
NOAA-15, USING ALL OBSERVATIONS

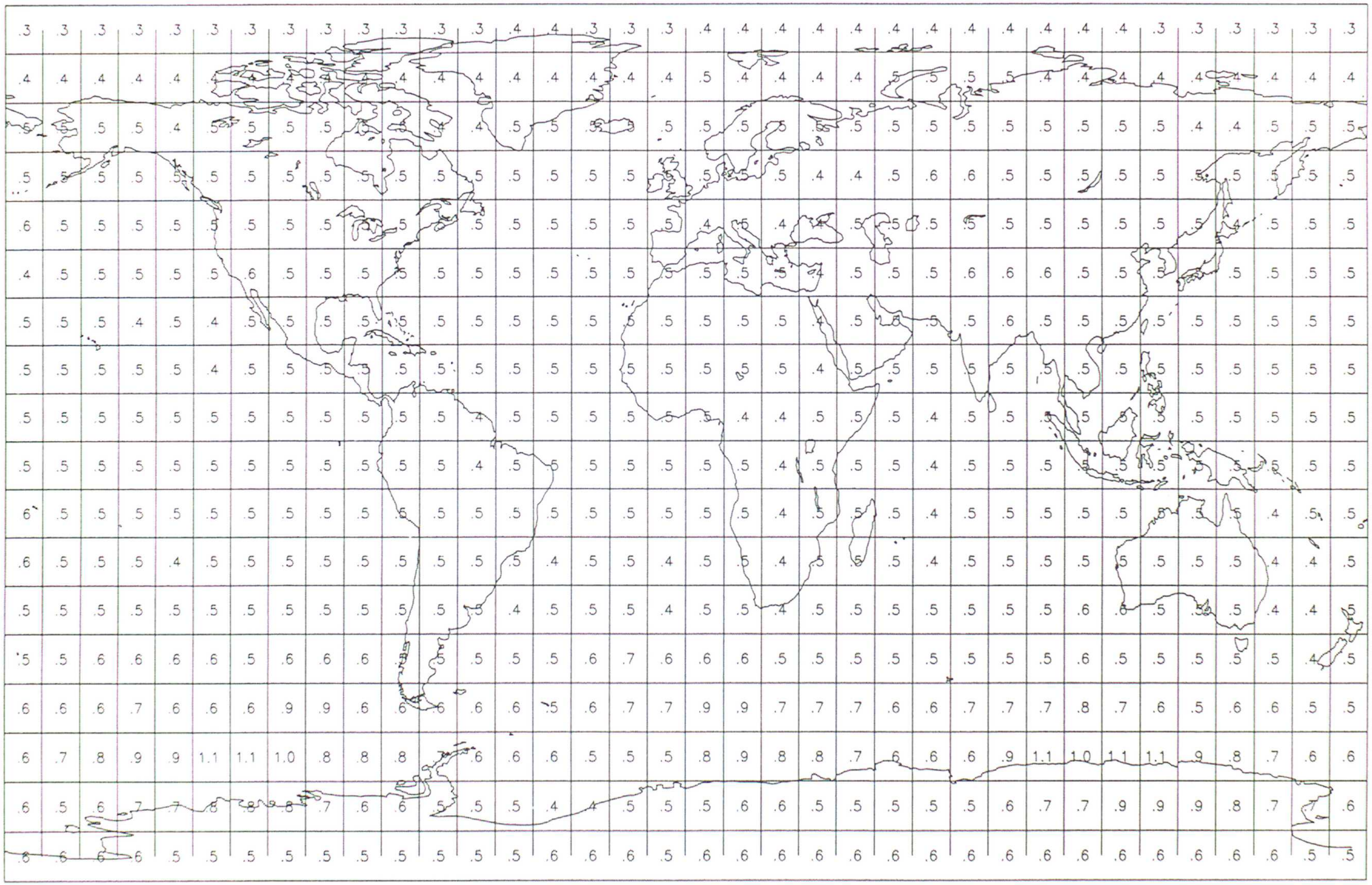
FIGURE 35


.3 .3 .3 .3 .3 .3 .4 .4 .9 1.4 1.7 .9 .8 1.0 1.1 1.2 .7 .5 .7 .8 .7 .7 .7 .6 .5 .5 .5 .4 .4 .4 .4 .5 .4 .3 .3 .3
.5 .5 .5 .5 .5 .6 .5 [illegible] .8 1.0 1.2 1.1 1.5 2.1 1.9 1.2 .6 .7 .7 .9 .8 .7 .8 .9 .8 .7 .6 .5 .6 .6 .6 .5 .5 .4 .4 .5
.6 .8 .8 1.1 .9 .7 .6 .6 .6 .6 .8 .9 .7 1.7 1.2 .8 [illegible] .6 .7 .8 .6 .6 .8 .8 .7 .6 .5 .8 .7 .7 .8 1.0 .9 .8 .9 .8
.7 .8 .8 .7 .8 .7 .6 .6 .6 .6 .8 .6 .7 .7 .7 .7 .7 .8 .7 .7 .6 .4 .4 .6 .6 .6 .8 1.0 1.0 .9 1.3 1.7 1.5 1.1 .7 .7
.7 .7 .8 .7 .6 .8 1.2 1.2 .8 .9 .9 [illegible] .8 .7 .7 .6 .6 .8 .8 .8 .7 .8 .8 .8 .8 1.5 1.5 1.4 1.1 .8 .7 .7 .9 .8 .8 .7
.7 .7 .6 .5 .4 .6 1.3 1.5 .9 .8 1.0 .8 .7 .6 .5 .5 .5 1.1 .8 .7 .8 .9 1.1 1.4 1.4 3.1 3.5 2.7 1.2 .9 .9 [illegible] 1.2 .9 .7 .6
.5 .6 .7 .4 .4 .4 .8 1.4 .9 1.1 1.1 .7 .5 .5 .5 .4 .9 .9 .6 .6 .6 .9 1.2 1.4 1.2 1.5 2.7 1.6 1.0 .8 .8 .6 .8 .5 .5 .6
.6 .7 .7 .5 .6 .6 .7 .9 1.0 1.0 1.0 .9 .8 .7 .8 .6 1.1 .9 .9 1.0 .9 1.0 1.2 .9 .7 1.1 1.0 1.0 1.0 1.1 1.1 .7 .7 .6 .7 .8
.6 .8 .9 .8 .6 .5 .5 .6 .7 .8 1.0 1.0 .7 .7 .7 .8 .8 .9 .9 1.0 .9 1.1 .8 .5 .8 1.0 1.1 1.0 1.2 1.1 1.0 .8 .8 .9 .7 1.0
.5 .4 .4 .4 .4 .4 .4 .4 .4 .5 1.1 .9 .8 .8 .6 .4 .4 .4 .5 .9 1.0 1.1 .5 .6 .6 .9 1.0 1.0 1.2 1.1 .9 1.1 1.0 1.0 .8 .5
1.0 .7 .5 .6 .6 .4 .4 .5 .6 .7 1.1 1.1 1.0 .9 .6 .4 .4 .4 .5 .9 .8 .7 .7 .5 .4 .8 .5 .5 .5 .5 1.0 .9 .8 .5 .8 .9
.8 .6 .6 .6 .7 .5 .5 .5 .7 1.0 .7 1.0 .9 .8 .6 .6 .6 .5 .6 .9 .8 .6 .7 .5 .5 .5 .6 .6 .6 1.0 1.1 1.0 1.1 .8 .5 .6
.5 .5 .5 .6 .7 .7 .6 .6 .6 .6 .8 .8 .8 .6 .7 .6 .7 .6 .6 .6 .7 .6 .5 .6 .6 .6 .9 1.0 .7 .7 .7 .8 .9 .7 .6 .7
.6 .6 .6 .7 .6 .6 .6 .7 .6 .6 .7 .7 .5 .6 .6 .6 .6 .7 .7 .7 .6 .6 .6 .6 .8 .7 .8 1.0 .8 .7 .6 .6 .7 .6 .7 .7
.7 .8 .9 1.0 .8 .8 .8 .8 .8 .7 .8 .7 .6 .6 .7 .7 .7 .8 .8 .9 .8 .7 .7 .8 .8 .8 .8 .9 .9 .7 .7 .7 .7 .7 .7 .7
.8 .9 .8 .9 1.0 1.3 1.5 1.3 1.1 .9 .8 1.0 .8 .7 .7 .7 .7 .7 .8 1.4 1.7 1.3 1.0 1.2 1.0 .8 1.1 1.4 1.6 1.6 1.6 1.8 1.3 1.0 .9 .8
1.1 .9 1.0 1.2 1.4 1.7 1.9 1.8 1.8 1.5 1.3 1.3 .9 .8 .9 1.3 1.6 2.1 2.7 2.9 2.8 2.4 2.1 1.9 1.7 1.6 2.0 2.8 2.9 3.2 3.2 2.8 2.0 2.0 1.9 1.0
1.7 1.8 1.6 1.6 1.6 1.6 1.6 1.7 1.8 1.4 1.1 1.0 1.1 1.2 1.3 1.6 1.6 1.7 1.8 2.0 2.3 2.5 2.6 2.4 2.4 2.4 2.3 2.1 2.0 1.7 1.5 1.6 1.8 2.1 1.8 1.5

ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C) FIGURE 36
OCTOBER 1999 : AMSUA-7 Channel (300 hPa)
NOAA-15, USING ALL OBSERVATIONS

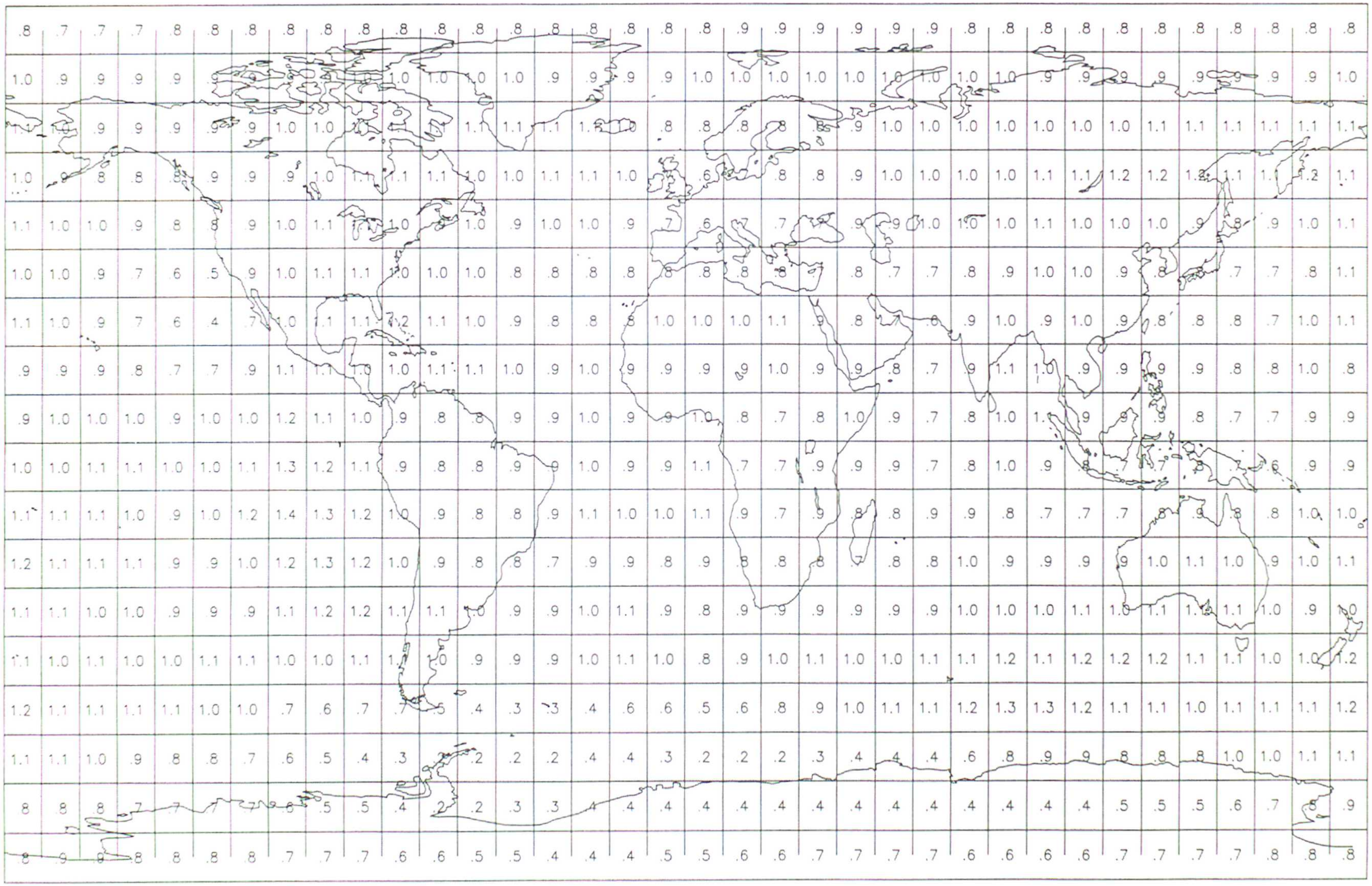


ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C) FIGURE 37
OCTOBER 1999 : AMSUA-7 channel (300 hPa)
NOAA-15, USING ALL OBSERVATIONS


.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4
.5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .6 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5
.4 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .6 .6 .6 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .4 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5
.6 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .4 .5 .5 .4 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .4 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .6 .6 .5 .5 .5 .4 .4 .5
.5 .5 .6 .6 .6 .6 .5 .6 .6 .6 .5 .5 .5 .5 .5 .6 .7 .6 .6 .6 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .4 .5
.6 .6 .6 .7 .6 .6 .6 .9 .9 .6 .6 .6 .6 .6 .5 .6 .7 .7 .9 .9 .7 .7 .7 .6 .6 .7 .7 .7 .8 .7 .6 .5 .6 .6 .5 .5
.6 .7 .8 .9 .9 1.1 1.1 1.0 .8 .8 .8 .7 .6 .6 .6 .5 .5 .5 .8 .9 .8 .8 .7 .6 .6 .6 .9 1.1 1.0 1.1 1.1 .9 .8 .7 .6 .6
.6 .5 .6 .7 .7 .8 .8 .8 .7 .6 .6 .5 .5 .5 .4 .4 .5 .5 .5 .6 .6 .5 .5 .5 .5 .5 .6 .7 .7 .9 .9 .9 .8 .7 .7 .6
.6 .6 .6 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .6 .6 .5 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .5 .5

ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)
OCTOBER 1999 : AMSUA-9 Channel (100 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 38


.8 .7 .7 .7 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .9 .9 .9 .9 .9 .9 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8
1.0 .9 .9 .9 .9 .9 .9 1.0 1.0 1.0 1.0 1.0 .9 .9 .9 .9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 .9 .9 .9 .9 .9 .9 .9 .9 1.0
1.1 1.0 .9 .9 .9 .9 .9 1.0 1.0 1.1 1.1 1.1 1.1 1.1 1.1 1.0 .8 .8 .8 .8 .8 .9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.1 1.1 1.1 1.1
1.0 .9 .8 .8 .8 .9 .9 .9 1.0 1.1 1.1 1.1 1.0 1.0 1.1 1.1 1.0 .6 .8 .8 .9 1.0 1.0 1.0 1.0 1.1 1.1 1.2 1.2 1.2 1.1 1.2 1.1
1.1 1.0 1.0 .9 .8 .8 .9 1.0 1.1 1.0 1.0 .9 1.0 1.0 .9 .7 .6 .7 .7 .7 .9 .9 1.0 1.0 1.0 1.1 1.0 1.0 1.0 .9 .8 .9 1.0 1.1
1.0 1.0 .9 .7 .6 .5 .9 1.0 1.1 1.1 1.0 1.0 1.0 .8 .8 .8 .8 .8 .8 .8 .8 .8 .7 .7 .8 .9 1.0 1.0 .9 .8 .7 .7 .8 1.1
1.1 1.0 .9 .7 .6 .4 .7 1.0 1.1 1.1 1.2 1.1 1.0 .9 .8 .8 .8 1.0 1.0 1.0 1.1 .9 .8 .7 .6 .9 1.0 .9 1.0 .9 .8 .8 .8 .7 1.0 1.1
.9 .9 .9 .8 .7 .7 .9 1.1 1.1 1.0 1.0 1.1 1.1 1.0 .9 1.0 .9 .9 .9 .9 1.0 .9 .9 .8 .7 .9 1.1 1.0 .9 .9 .9 .9 .8 .8 1.0 .8
.9 1.0 1.0 1.0 .9 1.0 1.0 1.2 1.1 1.0 .9 .8 .8 .9 .9 1.0 .9 .9 1.0 .8 .7 .8 1.0 .9 .7 .8 1.0 .9 .9 .9 .8 .7 .7 .9 .9
1.0 1.0 1.1 1.1 1.0 1.0 1.1 1.3 1.2 1.1 .9 .8 .8 .9 .9 1.0 .9 .9 1.1 .7 .7 .9 .9 .9 .7 .8 1.0 .9 .8 .7 .7 .8 .6 .9 .9
1.1 1.1 1.1 1.0 .9 1.0 1.2 1.4 1.3 1.2 1.0 .9 .8 .8 .9 1.1 1.0 1.0 1.1 .9 .7 .9 .8 .8 .9 .9 .8 .7 .7 .7 .8 .9 .8 .8 1.0 1.0
1.2 1.1 1.1 1.1 .9 .9 1.0 1.2 1.3 1.2 1.0 .9 .8 .8 .7 .9 .9 .8 .9 .8 .8 .8 .7 .8 .8 1.0 .9 .9 .9 .9 1.0 1.1 1.0 .9 1.0 1.1
1.1 1.1 1.0 1.0 .9 .9 .9 1.1 1.2 1.2 1.1 1.1 1.0 .9 .9 1.0 1.1 .9 .8 .9 .9 .9 .9 .9 .9 1.0 1.0 1.0 1.1 1.0 1.1 1.1 1.1 1.0 .9 1.0
1.1 1.0 1.1 1.0 1.0 1.1 1.1 1.0 1.0 1.1 1.1 1.0 .9 .9 .9 1.0 1.1 1.0 .8 .9 1.0 1.1 1.0 1.0 1.1 1.1 1.2 1.1 1.2 1.2 1.2 1.1 1.1 1.0 1.0 1.2
1.2 1.1 1.1 1.1 1.1 1.0 1.0 .7 .6 .7 .7 .5 .4 .3 .3 .4 .6 .6 .5 .6 .8 .9 1.0 1.1 1.1 1.2 1.3 1.3 1.2 1.1 1.1 1.0 1.1 1.1 1.1 1.2
1.1 1.1 1.0 .9 .8 .8 .7 .6 .5 .4 .3 .2 .2 .2 .4 .4 .3 .2 .2 .2 .2 .3 .4 .4 .4 .6 .8 .9 .9 .8 .8 .8 1.0 1.0 1.1 1.1
.8 .8 .8 .7 .7 .7 .7 .6 .5 .5 .4 .2 .2 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .6 .7 .8 .9
.8 .9 .8 .8 .8 .8 .8 .7 .7 .7 .6 .6 .5 .5 .4 .4 .4 .5 .5 .6 .6 .7 .7 .7 .7 .6 .6 .6 .6 .7 .7 .7 .7 .8 .8 .8

ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
OCTOBER 1999 : AMSUA-9 channel (100 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 39

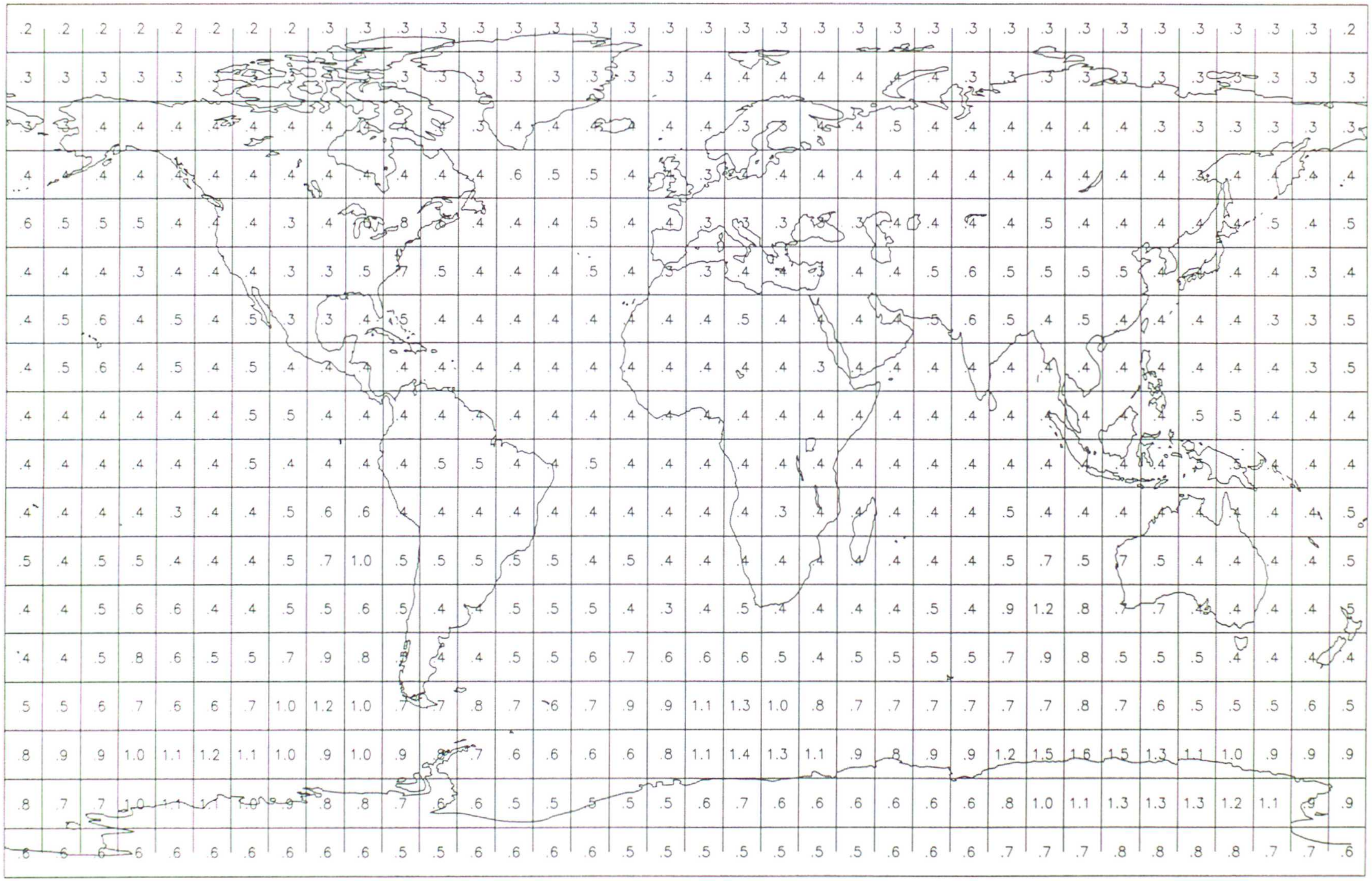

.2 .2 .2 .2 .2 .2 .2 .2 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2
.3 .3 .3 .3 .3 .3 .3 [illegible] .3 [illegible] .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .5 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .6 .5 .5 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4
.6 .5 .5 .5 .4 .4 .4 .3 .4 [illegible] .8 [illegible] .4 .4 .4 .5 .4 .4 .3 .3 .3 .3 .3 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .5 .4 .5
.4 .4 .4 .3 .4 .4 .4 .3 .3 .5 .7 .5 .4 .4 .4 .5 .4 .3 .3 .4 .4 .3 .4 .4 .5 .6 .5 .5 .5 .5 .4 .4 .4 .3 .4
.4 .5 .6 .4 .5 .4 .5 .3 .3 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .5 .6 .5 .4 .5 .4 .4 .4 .4 .3 .3 .5
.4 .5 .6 .4 .5 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .5
.4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4
.4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .5 .5 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4
.4 .4 .4 .4 .3 .4 .4 .5 .6 .6 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5
.5 .4 .5 .5 .4 .4 .4 .5 .7 1.0 .5 .5 .5 .5 .5 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .7 .5 .7 .5 .4 .4 .4 .4 .5
.4 .4 .5 .6 .6 .4 .4 .5 .5 .6 .5 .4 .4 .5 .5 .5 .4 .3 .4 .5 .4 .4 .4 .4 .5 .4 .9 1.2 .8 .7 .7 .4 .4 .4 .4 .5
.4 .4 .5 .8 .6 .5 .5 .7 .9 .8 .5 .4 .4 .5 .5 .6 .7 .6 .6 .6 .5 .4 .5 .5 .5 .5 .7 .9 .8 .5 .5 .5 .4 .4 .4 .4
.5 .5 .6 .7 .6 .6 .7 1.0 1.2 1.0 .7 .7 .8 .7 .6 .7 .9 .9 1.1 1.3 1.0 .8 .7 .7 .7 .7 .7 .7 .8 .7 .6 .5 .5 .5 .6 .5
.8 .9 .9 1.0 1.1 1.2 1.1 1.0 .9 1.0 .9 .8 .7 .6 .6 .6 .6 .8 1.1 1.4 1.3 1.1 .9 .8 .9 .9 1.2 1.5 1.6 1.5 1.3 1.1 1.0 .9 .9 .9
.8 .7 .7 1.0 1.1 1.1 1.0 .9 .8 .8 .7 .6 .6 .5 .5 .5 .5 .5 .6 .7 .6 .6 .6 .6 .6 .6 .8 1.0 1.1 1.3 1.3 1.3 1.2 1.1 .9 .9
.6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .5 .5 .6 .6 .6 .6 .5 .5 .5 .5 .5 .5 .5 .6 .6 .6 .7 .7 .7 .8 .8 .8 .8 .7 .7 .6

TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: October 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoy.

Area monitored :10°N - 80°N, 85°W - 0°W

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :All hours combined.

Elements monitored
:Mean sea-level pressure (hPa)
:Wind speed (m s^{-1})
:Wind direction (degrees)

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. A positive bias indicates the observation is veered to the background

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors

GROSS ERROR LIMITS :15 hPa (pressure)
:25 m s^{-1} (Vector Wind)

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
13504	26.3	-18.3	ALL	P	SUR	247	0	0	0.6	0.0	0.6
13506	16.4	-16.6	ALL	P	SUR	32	0	0	0.8	0.4	0.9
29909	29.2	-63.6	ALL	P	SUR	1	0	0	0.0	-0.9	0.9
41505	36.8	-58.8	ALL	P	SUR	312	0	0	1.1	0.2	1.1
41520	21.1	-54.1	ALL	P	SUR	279	0	0	0.7	-0.2	0.8
41521	28.7	-63.0	ALL	P	SUR	297	0	0	1.0	0.1	1.0
41524	14.8	-65.3	ALL	P	SUR	240	0	0	0.8	0.0	0.9
41525	15.1	-52.6	ALL	P	SUR	253	0	0	0.8	0.2	0.8
41528	37.5	-62.4	ALL	P	SUR	331	0	0	1.1	0.3	1.1
41599	30.6	-37.6	ALL	P	SUR	484	4	1	0.8	-0.3	0.8
41625	29.1	-71.6	ALL	P	SUR	289	0	0	0.9	0.5	1.0
41630	20.9	-43.3	ALL	P	SUR	275	0	0	0.8	0.2	0.8
41636	27.9	-36.0	ALL	P	SUR	298	4	1	1.0	0.5	1.1
41637	28.8	-49.3	ALL	P	SUR	185	3	2	0.6	0.4	0.8
41638	23.8	-55.7	ALL	P	SUR	457	3	1	1.1	0.4	1.2
41640	15.6	-55.9	ALL	P	SUR	185	0	0	1.3	0.3	1.4
41641	13.8	-51.5	ALL	P	SUR	239	0	0	0.9	0.4	0.9
41643	21.3	-54.7	ALL	P	SUR	239	0	0	0.7	0.3	0.7
41644	21.9	-45.9	ALL	P	SUR	265	0	0	0.7	0.0	0.7
41645	22.8	-50.0	ALL	P	SUR	67	0	0	0.6	-0.2	0.7
41648	45.4	-38.3	ALL	P	SUR	208	0	0	1.2	0.6	1.4
41649	26.2	-66.8	ALL	P	SUR	275	0	0	0.9	0.3	1.0
41650	26.6	-75.6	ALL	P	SUR	280	0	0	0.9	0.1	0.9
41651	24.4	-73.3	ALL	P	SUR	298	0	0	0.9	0.5	1.0
41652	21.7	-71.2	ALL	P	SUR	277	0	0	0.8	-0.6	1.0
41653	20.7	-67.1	ALL	P	SUR	246	0	0	1.3	-0.3	1.3
41654	17.8	-59.0	ALL	P	SUR	212	0	0	0.7	0.5	0.9
41852	38.6	-53.8	ALL	P	SUR	279	243	87	5.8	-5.8	8.2
41853	29.3	-71.4	ALL	P	SUR	440	0	0	0.9	1.0	1.4
44546	40.8	-33.8	ALL	P	SUR	1610	1	0	1.2	0.4	1.3
44607	53.1	-38.7	ALL	P	SUR	607	2	0	2.0	-0.2	2.1
44608	41.6	-18.6	ALL	P	SUR	1465	0	0	1.1	-0.1	1.1
44610	54.4	-35.9	ALL	P	SUR	1593	1	0	1.9	-0.2	1.9
44613	28.7	-23.9	ALL	P	SUR	865	3	0	0.8	0.2	0.8
44614	48.4	-30.3	ALL	P	SUR	676	3	0	2.2	-0.9	2.4
44616	59.3	-16.4	ALL	P	SUR	1138	1	0	1.3	0.0	1.3
44621	50.0	-22.1	ALL	P	SUR	769	8	1	1.9	-0.7	2.0
44624	58.5	-14.9	ALL	P	SUR	1582	5	0	1.4	-0.2	1.4
44625	49.8	-21.7	ALL	P	SUR	1158	1	0	1.6	-0.3	1.6
44626	47.5	-41.0	ALL	P	SUR	908	0	0	1.5	-0.6	1.6
44627	42.2	-46.4	ALL	P	SUR	860	0	0	1.3	-0.2	1.3
44628	37.6	-41.2	ALL	P	SUR	792	0	0	0.9	0.2	0.9
44630	45.2	-37.5	ALL	P	SUR	858	1	0	1.5	-0.4	1.5
44721	55.4	-39.6	ALL	P	SUR	130	0	0	1.0	-1.2	1.6
44722	50.6	-46.8	ALL	P	SUR	92	0	0	1.0	-1.1	1.5
44728	53.4	-10.3	ALL	P	SUR	138	0	0	1.4	0.4	1.5
44742	43.5	-6.4	ALL	P	SUR	10	0	0	2.0	-1.2	2.3
44765	31.4	-52.8	ALL	P	SUR	406	6	1	1.5	0.0	1.5
44766	53.3	-31.1	ALL	P	SUR	925	8	1	1.6	-0.9	1.8
44773	62.2	-24.5	ALL	P	SUR	1624	5	0	1.5	-0.6	1.6
44777	59.3	-49.9	ALL	P	SUR	1464	9	1	1.6	-0.7	1.7
44778	49.4	-3.7	ALL	P	SUR	797	0	0	0.9	0.0	0.9
49910	25.5	-76.8	ALL	P	SUR	1	0	0	0.0	0.2	0.2
62506	38.6	-18.4	ALL	P	SUR	602	0	0	2.4	1.7	2.9
62507	43.9	-19.2	ALL	P	SUR	583	0	0	1.4	-0.3	1.4
62508	46.9	-12.4	ALL	P	SUR	584	0	0	1.8	-0.9	2.0
62509	47.8	-15.6	ALL	P	SUR	1105	3	0	1.5	-0.2	1.5
62510	48.4	-14.0	ALL	P	SUR	522	0	0	1.6	-0.3	1.6
62520	31.3	-27.0	ALL	P	SUR	824	4	0	0.7	-0.2	0.7
62554	34.0	-14.2	ALL	P	SUR	836	3	0	0.8	0.2	0.8

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
62713	49.9	-2.9	ALL	P	SUR	1	0	0	0.0	-0.4	0.4
62809	57.0	0.0	ALL	P	SUR	1	0	0	0.0	-1.1	1.1
64516	63.1	-51.0	ALL	P	SUR	1284	0	0	1.2	-0.8	1.4
64517	60.3	-59.1	ALL	P	SUR	1207	0	0	1.6	-0.3	1.6
64518	55.9	-39.8	ALL	P	SUR	1213	0	0	1.6	-1.0	1.9
64530	61.4	-32.6	ALL	P	SUR	1001	15	1	1.6	-0.7	1.8
64546	62.4	-26.0	ALL	P	SUR	880	0	0	1.5	-0.7	1.7
64693	66.4	-22.3	ALL	P	SUR	395	0	0	1.5	-0.7	1.7
64694	66.9	-15.3	ALL	P	SUR	502	0	0	2.0	-0.2	2.0
64698	65.8	-33.4	ALL	P	SUR	885	1	0	1.6	-0.4	1.6
64699	61.7	-42.0	ALL	P	SUR	903	0	0	1.6	-0.6	1.7
64700	66.1	-27.9	ALL	P	SUR	732	22	3	2.9	1.3	3.2
65593	63.3	-20.1	ALL	P	SUR	830	2	0	1.5	-0.7	1.7
65594	61.0	-38.0	ALL	P	SUR	963	4	0	2.1	-0.8	2.2
65595	58.8	-27.8	ALL	P	SUR	1255	32	3	1.5	-1.0	1.8
65596	60.2	-31.8	ALL	P	SUR	817	0	0	1.4	-0.6	1.5
65599	62.1	-34.5	ALL	P	SUR	1674	8	0	1.7	-0.4	1.7
73504	26.7	-82.0	ALL	P	SUR	3	3	100			
WIND SPEED											
29909	29.2	-63.6	ALL	SPEED	SUR	1	0	0	0.0	-2.3	2.3
41521	28.7	-63.0	ALL	SPEED	SUR	293	0	0	1.5	-0.9	1.8
41524	14.8	-65.3	ALL	SPEED	SUR	206	0	0	5.7	13.5	14.6
41625	29.1	-71.6	ALL	SPEED	SUR	255	0	0	1.7	-1.5	2.2
41630	20.9	-43.3	ALL	SPEED	SUR	272	0	0	3.0	0.3	3.0
41640	15.6	-55.9	ALL	SPEED	SUR	176	0	0	2.7	0.2	2.8
41641	13.8	-51.5	ALL	SPEED	SUR	229	0	0	3.1	1.5	3.5
41644	21.9	-45.9	ALL	SPEED	SUR	1	0	0	0.0	-6.5	6.5
41648	45.4	-38.3	ALL	SPEED	SUR	2	0	0	0.1	8.0	8.0
41649	26.2	-66.8	ALL	SPEED	SUR	267	0	0	2.8	-0.3	2.8
41651	24.4	-73.3	ALL	SPEED	SUR	19	0	0	4.0	2.1	4.5
41652	21.7	-71.2	ALL	SPEED	SUR	273	0	0	3.8	1.4	4.0
44607	53.1	-38.7	ALL	SPEED	SUR	596	0	0	3.1	1.7	3.5
44721	55.4	-39.6	ALL	SPEED	SUR	127	0	0	1.9	-0.4	2.0
44722	50.6	-46.8	ALL	SPEED	SUR	29	0	0	0.9	-11.1	11.1
44773	62.2	-24.5	ALL	SPEED	SUR	1304	0	0	2.1	-0.6	2.1
44777	59.3	-49.9	ALL	SPEED	SUR	1310	0	0	2.1	-0.4	2.1
49910	25.5	-76.8	ALL	SPEED	SUR	1	0	0	0.0	-1.5	1.5
62506	38.6	-18.4	ALL	SPEED	SUR	593	0	0	1.9	0.2	1.9
62508	46.9	-12.4	ALL	SPEED	SUR	561	0	0	1.8	0.3	1.8
62510	48.4	-14.0	ALL	SPEED	SUR	510	0	0	2.6	1.5	3.0
62713	49.9	-2.9	ALL	SPEED	SUR	1	0	0	0.0	4.4	4.4
62809	57.0	0.0	ALL	SPEED	SUR	1	0	0	0.0	-0.3	0.3
65599	62.1	-34.5	ALL	SPEED	SUR	1499	0	0	2.5	-0.4	2.6
WIND DIRECTION											
41521	28.7	-63.0	ALL	DIRN.	SUR	195	0	0	21.1	-3.9	21.4
41524	14.8	-65.3	ALL	DIRN.	SUR	119	0	0	18.3	0.1	18.3
41625	29.1	-71.6	ALL	DIRN.	SUR	167	0	0	14.5	5.3	15.4
41630	20.9	-43.3	ALL	DIRN.	SUR	210	0	0	16.2	20.4	26.1
41640	15.6	-55.9	ALL	DIRN.	SUR	88	0	0	19.7	2.4	19.8
41641	13.8	-51.5	ALL	DIRN.	SUR	122	0	0	19.1	19.3	27.1
41648	45.4	-38.3	ALL	DIRN.	SUR	2	0	0	17.3	-44.7	48.0
41649	26.2	-66.8	ALL	DIRN.	SUR	140	0	0	23.0	14.0	26.9
41651	24.4	-73.3	ALL	DIRN.	SUR	13	0	0	34.7	-27.5	44.3
41652	21.7	-71.2	ALL	DIRN.	SUR	189	0	0	22.5	-2.1	22.6
44607	53.1	-38.7	ALL	DIRN.	SUR	482	0	0	20.2	0.5	20.2
44721	55.4	-39.6	ALL	DIRN.	SUR	102	0	0	14.1	5.3	15.1
44773	62.2	-24.5	ALL	DIRN.	SUR	1121	0	0	15.3	-3.2	15.6
44777	59.3	-49.9	ALL	DIRN.	SUR	1160	0	0	19.3	1.0	19.3
49910	25.5	-76.8	ALL	DIRN.	SUR	1	0	0	0.0	12.5	12.5

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
WIND DIRECTION											
62506	38.6	-18.4	ALL	DIRN.	SUR	463	0	0	15.2	-13.0	20.0
62508	46.9	-12.4	ALL	DIRN.	SUR	398	0	0	20.6	-14.9	25.4
62510	48.4	-14.0	ALL	DIRN.	SUR	341	0	0	25.3	-5.5	25.9
62713	49.9	-2.9	ALL	DIRN.	SUR	1	0	0	0.0	-15.5	15.5
62809	57.0	0.0	ALL	DIRN.	SUR	1	0	0	0.0	12.1	12.1
65599	62.1	-34.5	ALL	DIRN.	SUR	1065	0	0	26.2	1.9	26.3

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: October 1999

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:40°N - 70°N, 60°W - 0°W.
Standard of comparison		:Background field from UKMO global model.
Observation times		:All hours combined.
Level(s) monitored		:300.0 - 150.0 hPa
Elements monitored		:TEMP in °C ; WIND in m s^{-1}
Parameters monitored	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.
GROSS ERROR LIMITS	:10.0 °C ; 60 m s^{-1} Vector Wind	
SELECTION CRITERIA	:N REP $\geq$ 20	

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

		TEMPERATURE				WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	3077	1	5	1.7	0.1	3032	0	6	0	9.3	0.9
ACA	1460	1	2	1.7	-0.1	1454	0	3	0	8.2	0.8
AEA	178	1	4	2.3	0.6	171	0	8	0	13.3	-0.5
AEL	316	21	39	4.3	2.1	320	1	11	0	9.6	0.7
AFL	351	0	5	2.0	0.6	351	1	4	0	7.4	0.8
AFR	1122	5	13	2.1	0.3	1132	0	9	0	8.7	1.1
AIH	324	1	2	1.6	0.2	325	1	4	0	8.2	1.0
AJM	66	0	6	2.0	0.1	68	0	4	0	7.2	1.2
AMM	57	2	7	2.4	1.1	56	0	4	0	7.6	1.3
AMX	179	4	7	2.1	0.3	179	1	8	0	12.3	0.3
ANZ	179	0	4	1.8	-1.1	179	0	3	0	5.6	0.5
AOM	287	0	1	1.8	0.5	298	0	2	0	7.4	1.0
AUA	30	0	0	1.1	0.2	31	0	3	0	9.9	0.5
AVA	181	2	4	2.1	0.4	184	1	5	0	9.9	0.6
AZA	551	14	30	3.9	2.4	563	0	9	0	10.1	1.3
BAF	31	0	3	1.5	-0.9	33	3	12	0	12.0	0.3
BAL	242	1	14	1.6	-0.6	244	0	15	0	7.7	0.2
BAW	1476	0	7	1.9	-0.1	1480	0	9	0	8.3	0.5
BBB	28	0	4	1.2	-0.6	30	0	7	0	12.1	0.1
BLX	30	0	3	1.7	-0.3	28	0	11	0	13.4	0.4
BWA	64	2	2	1.9	1.3	69	0	6	0	11.7	1.1
CDN	780	1	3	1.8	0.4	771	0	3	0	7.7	0.7
CFG	444	0	2	1.8	-0.8	449	1	4	0	8.4	0.2
CKS	23	13	13	1.4	-0.5	24	0	4	0	9.3	2.4
CKT	99	0	1	2.0	1.4	103	1	2	0	8.4	1.6
CLX	304	3	5	1.8	-0.5	307	0	4	0	8.2	0.3
CMM	357	0	3	1.5	0.1	350	0	4	0	7.1	0.6
COA	845	0	5	1.7	0.1	839	0	12	0	13.2	3.2
CRL	132	1	4	1.6	0.6	133	0	4	0	8.4	1.6
CTB	77	0	0	1.6	-0.1	77	0	3	0	9.8	1.4
CUB	203	0	8	2.9	1.6	207	0	8	0	8.9	0.8
DAL	2028	0	14	1.9	-0.4	2058	0	15	0	9.1	0.6
DBY	306	0	3	1.7	-0.2	308	0	5	0	9.9	0.0
DLH	2251	1	5	1.7	0.0	2253	0	6	0	8.7	0.8
EEZ	44	32	41	4.0	3.4	45	0	13	0	8.6	3.1
ELY	124	1	3	1.3	0.1	127	1	6	0	9.1	0.1
EWW	124	0	3	1.9	0.6	125	0	3	0	8.4	1.3
FDX	698	0	6	1.8	0.6	698	0	7	0	9.6	0.5
FIN	319	1	4	1.8	0.3	313	1	6	0	10.2	0.7
GAF	56	0	9	2.0	-0.5	55	0	11	0	12.0	0.4
GCO	29	0	7	2.3	1.1	31	0	19	0	15.1	5.5
GRL	27	0	0	1.5	-0.1	27	0	0	0	4.6	0.2
GTI	142	3	11	1.8	-0.6	146	0	12	0	10.8	0.9
HLF	52	2	6	2.0	-0.7	56	2	5	0	8.6	0.4
IBE	1402	1	15	2.1	0.3	1404	0	16	0	9.8	0.7
ICE	1230	0	3	1.6	0.1	1214	0	4	0	7.3	0.7
IWD	49	2	6	1.5	-0.2	51	2	8	0	10.2	1.2
JKK	149	1	9	1.7	-0.1	140	0	14	0	11.3	-0.3
KLM	1764	1	7	1.7	0.2	1776	0	8	0	8.8	0.8
LDA	83	0	8	1.6	-0.6	83	0	10	0	8.4	0.4
LDI	225	1	46	3.5	1.2	231	0	13	0	10.2	0.6
LGL	32	0	0	1.8	-0.7	32	0	3	0	6.9	-0.6
LIB	78	0	8	2.1	1.1	85	4	14	0	12.2	1.4
LOT	251	0	3	2.1	-1.1	251	1	7	0	10.7	0.3
LTU	355	1	6	1.5	0.0	356	0	8	0	8.9	1.0
MAS	40	0	0	1.9	0.9	41	0	5	0	9.4	0.7
MON	154	1	3	1.5	0.0	151	1	5	0	10.3	0.9
MPD	120	1	6	1.7	0.2	118	2	7	0	8.1	1.1
MPH	455	0	2	1.8	-0.4	461	1	3	0	8.6	0.8

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
NCA	38	0	5	2.0	0.8	38	0	3	0	12.0	0.5
NWA	3222	0	2	2.0	0.7	3093	0	3	0	8.9	0.6
OAL	38	0	3	2.1	1.2	40	0	8	0	13.2	-0.8
PAC	79	1	56	3.6	1.0	79	0	10	0	14.3	-0.5
RCH	179	4	9	2.0	1.0	179	0	12	0	11.7	1.8
ROY	80	1	4	1.3	-0.3	84	0	2	0	7.4	1.3
RRR	98	3	7	1.7	-0.3	99	0	6	0	7.9	0.2
SAB	33	0	3	1.9	0.0	36	0	3	0	7.6	2.8
SAS	1481	0	26	1.7	-0.3	1482	0	27	0	8.4	0.4
SIA	135	0	4	1.8	-0.9	135	0	7	0	9.6	0.4
SLR	103	1	14	1.9	-0.8	103	0	12	0	8.0	0.9
SVA	91	0	3	1.7	-0.1	93	0	2	0	8.3	0.6
SWR	63	2	6	1.4	0.3	64	0	6	0	9.2	3.3
TAP	429	0	6	1.8	-0.1	423	0	7	0	10.1	1.1
TOW	139	0	3	2.3	1.1	139	1	6	0	9.5	1.7
TSC	138	0	1	1.9	0.6	143	0	3	0	9.2	0.8
TWA	1161	2	6	1.9	0.3	1081	0	5	0	9.4	0.5
UAL	1993	0	5	1.8	0.1	2015	0	5	0	7.7	0.2
UPS	638	1	16	1.9	0.3	643	0	17	0	9.5	0.7
USA	283	0	1	1.8	0.1	212	0	2	0	9.6	1.1
VIR	491	1	4	1.8	-0.2	498	0	6	0	9.1	1.5
VKG	44	0	5	1.8	0.8	46	0	7	0	10.3	1.0
WOA	101	0	9	1.8	0.6	103	0	10	0	7.8	1.7
BA	1582	0	3	1.4	0.3	1580	0	3	0	6.1	0.6
EU	24051	0	21	1.5	0.0	24051	0	20	0	6.8	0.8
KL	2670	0	3	1.5	0.7	2668	0	3	0	6.7	0.7
LH	342	0	2	1.6	1.0	342	0	2	0	5.4	0.5
N	403	1	4	2.3	0.1	417	1	5	0	9.3	0.7
US ACARS	13868	0	12	1.7	0.7	13861	0	8	0	7.4	0.7

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: October 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DBBH	00	Z	100	21	0	12.4	22.5	18.8
DBBH	12	Z	100	24	0	12.0	13.9	7.0
DBLK	00	Z	100	1	0	0.0	1.0	1.0
DBLK	12	Z	100	7	0	19.0	19.3	3.3
ELML7	00	Z	100	19	0	13.0	28.7	25.6
ELML7	12	Z	100	16	0	15.6	40.3	37.2
FNOR	00	Z	100	13	0	7.9	22.1	20.7
FNOR	12	Z	100	11	0	8.2	20.2	18.5
FNOU	00	Z	100	14	0	10.8	28.9	26.9
FNOU	12	Z	100	12	0	16.9	31.4	26.5
FNPH	00	Z	100	11	0	6.2	20.8	19.8
FNPH	12	Z	100	9	0	11.7	21.2	17.7
FNRS	00	Z	100	12	0	13.3	25.8	22.1
FNRS	12	Z	100	12	0	17.2	25.5	18.8
JBOA	00	Z	100	1	0	0.0	8.0	8.0
JCCX	00	Z	100	1	0	0.0	17.0	17.0
JGQH	00	Z	100	1	0	0.0	32.0	32.0
JIVB	00	Z	100	1	0	0.0	45.0	45.0
LDWR	00	Z	100	23	0	8.5	9.3	3.8
LDWR	12	Z	100	21	0	10.9	11.4	-3.3
OVYA2	00	Z	100	13	0	16.7	16.7	0.9
OVYA2	12	Z	100	15	0	9.5	10.6	-4.9
OXYH2	00	Z	100	15	0	7.5	17.5	15.8
OXYH2	12	Z	100	14	0	17.2	21.7	13.3
SHIPAF	00	Z	100	1	0	0.0	26.0	26.0
S6LA	00	Z	100	4	0	7.6	42.7	42.0
S6LA	12	Z	100	4	0	10.6	34.4	32.8
ZCBP6	00	Z	100	2	0	9.0	9.0	0.0
ZCBP6	12	Z	100	2	0	45.0	45.1	-3.0
03953	00	Z	100	30	0	11.2	27.6	25.2
03953	12	Z	100	29	0	11.5	17.2	12.8
04018	00	Z	100	31	0	14.9	18.0	10.2
04018	12	Z	100	27	0	12.0	14.3	7.9
04220	00	Z	100	30	0	10.5	13.3	8.3
04220	12	Z	100	28	0	12.8	18.2	13.0
04270	00	Z	100	30	0	11.6	12.9	5.6
04270	12	Z	100	27	0	13.2	13.3	1.4
04339	00	Z	100	25	0	11.2	14.8	9.6
04339	12	Z	100	25	0	9.5	9.9	2.6
04360	00	Z	100	31	0	16.1	17.1	6.0
04360	12	Z	100	29	0	14.3	14.4	-0.9
08001	00	Z	100	27	0	14.2	14.2	0.7
08001	12	Z	100	26	0	15.0	15.7	-4.6
08508	00	Z	100	1	0	0.0	15.0	-15.0
08508	12	Z	100	23	0	16.0	17.7	7.6
08522	00	Z	100	1	0	0.0	12.0	12.0
08522	12	Z	100	27	0	12.7	13.3	3.9
08594	00	Z	100	17	0	13.0	27.6	24.4
08594	12	Z	100	20	0	22.3	33.2	24.6
60020	00	Z	100	2	0	1.0	31.0	31.0
60020	12	Z	100	1	0	0.0	1.0	1.0
71600	00	Z	100	30	0	11.9	11.9	-0.1
71600	12	Z	100	29	0	13.4	15.3	-7.3
72201	00	Z	100	27	0	13.3	29.5	26.3
72201	12	Z	100	24	0	9.4	37.1	35.9
72402	00	Z	100	29	0	11.9	26.1	23.2
72402	12	Z	100	28	0	18.6	42.1	37.8
74494	00	Z	100	25	0	9.9	12.7	7.9
74494	12	Z	100	28	0	12.2	12.7	-3.5
78016	00	Z	100	29	0	11.0	25.0	22.5
78016	12	Z	100	27	0	22.4	37.2	29.7

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: October 1999

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DBBH	00	Z	500	21	0	12.5	16.1	10.1
DBBH	12	Z	500	25	0	12.7	12.8	1.7
DBLK	00	Z	500	1	0	0.0	3.0	-3.0
DBLK	12	Z	500	8	0	16.7	17.8	6.1
ELML7	00	Z	500	22	0	10.4	12.4	6.8
ELML7	12	Z	500	16	0	7.5	11.9	9.3
FNOR	00	Z	500	14	0	12.5	15.4	9.0
FNOR	12	Z	500	12	0	6.8	16.0	14.4
FNOU	00	Z	500	15	0	5.0	8.2	6.5
FNOU	12	Z	500	12	0	10.4	10.9	3.3
FNPH	00	Z	500	11	0	4.8	7.8	6.2
FNPH	12	Z	500	11	0	5.6	9.3	7.4
FNRS	00	Z	500	12	0	7.5	7.7	2.1
FNRS	12	Z	500	13	0	12.1	12.2	-0.7
JBOA	00	Z	500	1	0	0.0	3.0	-3.0
JCCX	00	Z	500	1	0	0.0	11.0	11.0
JGQH	00	Z	500	1	0	0.0	14.0	14.0
JIVB	00	Z	500	1	0	0.0	20.0	20.0
LDWR	00	Z	500	23	0	10.5	10.5	-1.0
LDWR	12	Z	500	21	0	10.1	10.6	-3.2
OVYA2	00	Z	500	18	0	13.9	16.8	-9.5
OVYA2	12	Z	500	16	0	7.3	17.8	-16.3
OXYH2	00	Z	500	17	0	10.0	13.0	8.4
OXYH2	12	Z	500	16	0	8.8	10.6	5.9
SHIP	00	Z	500	1	0	0.0	3.0	-3.0
SHIPAF	00	Z	500	2	0	0.5	0.7	0.5
S6LA	00	Z	500	5	0	24.3	25.0	5.8
S6LA	12	Z	500	4	0	4.0	22.6	22.3
ZCBP6	00	Z	500	2	0	12.0	12.0	0.0
ZCBP6	12	Z	500	2	0	20.5	27.0	-17.5
03953	00	Z	500	30	0	10.6	14.5	9.8
03953	12	Z	500	29	0	8.5	12.3	8.9
04018	00	Z	500	31	0	11.5	17.3	12.9
04018	12	Z	500	27	0	8.5	12.3	8.9
04220	00	Z	500	30	0	7.8	13.5	11.0
04220	12	Z	500	28	0	12.6	15.4	8.8
04270	00	Z	500	31	0	12.6	13.6	5.0
04270	12	Z	500	28	0	11.9	12.0	1.1
04339	00	Z	500	26	0	8.3	16.2	13.9
04339	12	Z	500	26	0	7.0	8.4	4.6
04360	00	Z	500	31	0	12.0	13.3	5.7
04360	12	Z	500	29	0	10.7	10.7	-0.2
08001	00	Z	500	30	0	9.9	9.9	0.5
08001	12	Z	500	26	0	12.9	13.0	-1.8
08508	00	Z	500	1	0	0.0	3.0	-3.0
08508	12	Z	500	25	0	10.1	12.2	6.8
08522	00	Z	500	1	0	0.0	16.0	16.0
08522	12	Z	500	27	0	10.9	11.2	2.7
08594	00	Z	500	19	0	6.7	8.6	5.4
08594	12	Z	500	23	1	6.9	6.9	0.5
60020	00	Z	500	30	0	9.9	12.7	7.9
60020	12	Z	500	28	0	25.9	27.1	8.2
71600	00	Z	500	30	0	8.1	8.2	-1.4
71600	12	Z	500	29	0	16.3	16.6	-3.3
72201	00	Z	500	28	0	6.9	14.4	12.7
72201	12	Z	500	25	0	12.8	15.2	8.2
72402	00	Z	500	29	0	17.6	17.9	-3.2
72402	12	Z	500	28	0	9.1	9.1	0.3
74494	00	Z	500	30	0	10.5	11.2	3.9
74494	12	Z	500	29	0	9.9	10.0	1.5
78016	00	Z	500	29	0	8.6	16.6	14.2
78016	12	Z	500	27	0	17.3	26.8	20.4

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: October 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :100 hPa.

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored :NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	00	V	100	17	0	0	0.0	-0.6	0.7
DBBH	12	V	100	23	0	0	3.0	-0.1	0.4
DBLK	00	V	100	1	0	0	3.2	3.2	3.3
DBLK	12	V	100	9	0	0	3.2	-2.0	-0.4
ELML7	00	V	100	16	0	0	3.2	1.3	1.2
ELML7	12	V	100	15	0	0	4.3	0.0	-0.4
FNOR	00	V	100	9	0	11	4.6	0.6	2.4
FNOR	12	V	100	8	0	0	4.6	0.3	0.6
FNOU	00	V	100	13	0	0	4.6	-0.3	1.1
FNOU	12	V	100	12	0	0	3.2	2.5	0.6
FNPH	00	V	100	9	0	0	3.5	1.2	0.5
FNPH	12	V	100	7	0	0	3.5	0.2	0.0
FNRS	00	V	100	10	0	0	3.5	-0.3	0.3
FNRS	12	V	100	11	0	0	2.9	0.3	0.3
JBOA	00	V	100	1	0	0	4.8	0.2	1.7
JCCX	00	V	100	1	0	0	4.8	-0.2	1.4
JGQH	00	V	100	1	0	0	4.8	2.6	0.3
JIVB	00	V	100	1	0	0	5.8	-0.7	4.0
LDWR	00	V	100	22	0	0	5.8	0.2	-0.1
LDWR	12	V	100	21	0	0	1.7	0.7	-0.7
OVYA2	00	V	100	11	0	0	2.6	0.6	0.7
OVYA2	12	V	100	14	0	0	4.2	1.1	0.8
OXYH2	00	V	100	13	0	0	2.5	0.6	1.9
OXYH2	12	V	100	13	0	7	3.0	-1.3	3.0
SHIPAF	00	V	100	1	0	0	5.5	-0.9	2.4
S6LA	00	V	100	4	0	0	5.5	-1.0	-1.8
S6LA	12	V	100	4	0	0	5.5	-2.8	-0.6
ZCBP6	00	V	100	2	0	0	5.5	-5.3	-2.5
ZCBP6	12	V	100	2	0	0	5.5	-0.3	-0.1
03953	00	V	100	30	0	0	3.5	0.7	1.7
03953	12	V	100	29	0	0	2.6	-0.1	1.1
04018	00	V	100	30	0	0	3.1	0.4	0.1
04018	12	V	100	26	0	0	3.0	0.7	-0.5
04220	00	V	100	21	0	0	2.4	0.0	1.3
04220	12	V	100	22	0	0	3.4	0.8	1.0
04270	00	V	100	25	0	0	2.3	0.9	0.9
04270	12	V	100	27	0	0	2.9	1.5	0.9
04339	00	V	100	22	0	4	3.0	2.8	-1.7
04339	12	V	100	24	0	0	5.9	-0.3	0.6
04360	00	V	100	31	0	6	3.2	-0.2	-0.8
04360	12	V	100	29	0	0	3.0	-0.5	-0.1
08001	00	V	100	25	0	0	3.6	0.6	1.0
08001	12	V	100	20	0	0	4.3	-0.8	0.2
08508	00	V	100	1	0	0	3.6	-0.4	0.3
08508	12	V	100	18	0	0	3.6	-1.1	0.6
08594	00	V	100	15	0	100	4.5	1.1	2.2
08594	12	V	100	22	0	100	4.1	0.3	2.5
71600	00	V	100	30	0	0	6.2	0.0	0.1
71600	12	V	100	29	0	0	3.0	-0.2	0.8
72201	00	V	100	27	0	0	13.1	0.7	0.0
72201	12	V	100	24	0	0	2.0	0.3	0.1
72402	00	V	100	28	0	0	2.9	0.1	0.5
72402	12	V	100	28	0	0	3.4	0.3	0.2
74494	00	V	100	25	0	0	1.6	-0.6	1.2
74494	12	V	100	28	0	0	1.6	-0.8	1.1
78016	00	V	100	29	0	0	3.0	1.7	-0.9
78016	12	V	100	27	0	0	4.2	0.6	0.8

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: October 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:VECTOR WIND in $m\ s^{-1}$
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS:	Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	00	V	500	20	0	0	0.0	-0.3	-0.5
DBBH	12	V	500	21	0	0	2.3	-0.5	-0.5
DBLK	00	V	500	1	0	0	2.0	0.7	2.2
DBLK	12	V	500	8	0	0	2.0	0.2	0.4
ELML7	00	V	500	18	0	0	2.0	0.2	-0.7
ELML7	12	V	500	14	0	0	2.3	-0.3	2.4
FNOR	00	V	500	13	0	0	3.4	-0.4	0.0
FNOR	12	V	500	11	0	0	3.0	0.6	1.5
FNOU	00	V	500	14	0	0	2.2	-0.8	1.3
FNOU	12	V	500	12	0	0	3.6	0.7	0.9
FNPH	00	V	500	11	0	0	3.4	-2.0	0.1
FNPH	12	V	500	10	0	0	2.6	-2.0	0.1
FNRS	00	V	500	10	0	0	2.7	0.9	-0.1
FNRS	12	V	500	12	0	0	2.6	1.4	-0.1
JBOA	00	V	500	1	0	0	4.9	-0.1	-0.8
JCCX	00	V	500	1	0	0	4.9	-4.0	1.9
JGQH	00	V	500	1	0	0	4.9	-4.1	0.6
JIVB	00	V	500	1	0	0	3.1	-0.8	-1.6
LDWR	00	V	500	23	0	0	3.1	-0.9	0.1
LDWR	12	V	500	21	0	0	2.5	0.1	-0.7
OVYA2	00	V	500	17	0	0	1.8	-0.2	0.2
OVYA2	12	V	500	14	0	0	4.4	-0.5	0.5
OXYH2	00	V	500	16	0	12	3.5	0.0	-0.7
OXYH2	12	V	500	11	0	18	3.3	-2.1	1.5
SHIPAF	00	V	500	1	0	0	4.0	3.7	-1.8
S6LA	00	V	500	5	0	0	4.0	-2.8	4.0
S6LA	12	V	500	4	0	0	4.0	-3.0	2.7
ZCBP6	12	V	500	1	0	0	4.0	4.6	2.7
03953	00	V	500	29	0	0	2.7	-0.7	-1.6
03953	12	V	500	28	0	0	2.8	-0.7	0.2
04018	00	V	500	30	0	0	3.1	0.6	0.2
04018	12	V	500	26	0	0	4.6	0.6	0.0
04220	00	V	500	23	0	0	2.9	1.1	1.0
04220	12	V	500	23	0	0	4.0	-0.4	0.3
04270	00	V	500	28	0	0	2.5	-1.2	-0.3
04270	12	V	500	28	0	0	2.9	1.0	0.0
04339	00	V	500	24	0	4	3.0	2.0	-0.4
04339	12	V	500	26	0	3	5.1	-1.7	-0.3
04360	00	V	500	31	0	0	5.6	-0.3	0.9
04360	12	V	500	29	0	0	3.9	-0.4	0.2
08001	00	V	500	29	0	0	3.1	-0.5	0.4
08001	12	V	500	25	0	0	2.8	0.5	-0.1
08508	00	V	500	1	0	0	4.3	3.2	-4.3
08508	12	V	500	22	0	0	4.3	0.9	-0.4
08594	00	V	500	21	0	100	4.0	0.5	-0.7
08594	12	V	500	25	1	96	2.8	-6.0	-1.8
60020	00	V	500	25	0	0	2.7	0.0	0.3
60020	12	V	500	26	0	0	3.1	1.0	-0.7
71600	00	V	500	30	0	0	4.4	1.2	0.9
71600	12	V	500	29	0	3	4.4	2.7	1.5
72201	00	V	500	27	0	0	14.9	0.5	-0.8
72201	12	V	500	25	0	0	2.4	0.0	0.2
72402	00	V	500	29	0	0	2.3	-0.2	0.2
72402	12	V	500	28	0	0	2.6	0.8	0.7
74494	00	V	500	30	0	0	2.2	-0.2	-0.1
74494	12	V	500	29	0	0	1.9	-0.1	1.4
78016	00	V	500	29	0	0	2.7	-0.1	0.0
78016	12	V	500	27	0	0	3.3	0.6	-0.3

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45